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# *The Victoria readers*

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THE  
VICTORIA READERS

*BOOK IV.*

A SERIES OF LESSONS  
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CLOTHING, WASHING, FOOD  
FOR STANDARD IV.

BY

WILLIAM J. POPE, F.G.S.,

FIRST-CLASS HONOURS AND MEDALLIST IN HYGIENE AND AGRICULTURE ;  
HEAD-MASTER OF THE LEWISHAM BRIDGE SCHOOL, LONDON, S.E. ;  
AUTHOR OF "POPE'S SCHOOL READERS" ; EDITOR OF  
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## PREFACE

THIS book has been carefully prepared in narrative form as a general class reader. Great care has been taken in the choice of language to make it a book for pleasant reading, and not one of facts alone. A chatty style has been adopted, and the lessons form a continuous series exactly in accordance with the Syllabus of Domestic Economy for Standard IV., as laid down in the Code.

W. J. P.

LEWISHAM BRIDGE SCHOOL,  
LONDON, S.E.

*Extract from the Instructions to Her Majesty's  
Inspectors.*

"All that is purely technical, whether in the mode of study or in the language and terminology, should be carefully avoided."

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# THE VICTORIA READERS

[*For the Manufacture of Materials, see Book III.*]

## CLOTHING AND SHELTER

THE winter of 1894 was a very severe one; but the following spring was so summer-like and warm, that Mrs. Harris, early in the month of May, sat darning stockings on the garden seat when her husband came home from work.

“ What ! another new coat ? Well, I hope you will find a place in which to put it. The cupboard is already full of your things of one kind and another : you seem to be always buying new clothes.”

This is what Mrs. Harris said to her husband, as, after he had left work, he came slowly walking up the garden path, wearing a new, thin, summer coat.

The weather had suddenly changed, and from the cold of winter it had become quite

warm and sultry. So Mr. Harris, who was a clerk in an office, and who had all day been sitting in a stuffy room, felt so done up, as he called it, that he had bought a new, thin coat, and left his old thick one to be repaired.

"Yes, my dear," said he to his wife; "all



my things are so thick and warm that I really must have some thin summer clothes this year. I wish I lived in the South Sea Islands, so that I could almost do without clothes."

"Well, I hope you will never say anything more about ladies buying new things. I am sure we seldom buy anything new. It is

alter and mend, and mend and alter, all the year round with us. Of course the fashions will change, and if a woman does not wish to look like an ancient Briton, she must change with the times."

"Yes," said Mr. Harris, "there can be no doubt that the fashions do alter. It was only to-day that I met your brother George actually running down the street with a parcel. Of course I stopped to speak to him; but he ran on saying, 'Don't stop me, that is a good fellow. I have bought a new hat for my wife, and I want her to have it before it goes out of fashion.'"

As the change in the weather was so sudden and so great, every one felt over-powered with the heat; and so those who could, either turned out their last summer's clothes, or got new ones.

This of course brought up the subject of clothing; and, after tea, Mr. Harris and his wife sat on the garden seat and talked, whilst their four children played about on the grass.

"I must say," said Mrs. Harris, "that I think the clothes which we wear in this country are not half so comfortable as they ought to be. I am sure I sometimes feel as if I should melt, and if you leave off your

thick clothes you are almost sure to catch a cold."

"Yes, that is so," replied her husband; "but the weather here is not so settled as it is in some parts of the world. There the weather for weeks together is either wet or dry, or hot or cold; but here we get a mixture of all, and sometimes all in the same day."

## EARLY CLOTHING

"I have often wondered," continued Mr. Harris, "what kind of clothes the first people wore. They could have had no coats, nor trousers, nor dresses, nor hats, nor boots, for there were no tailors, nor dressmakers, nor hatters, nor bootmakers to make them.

"It is true that most likely they lived in warm countries, where they did not so much want clothes to keep themselves warm, as to protect themselves from nettles and prickles, and to keep away flies and wasps and other insects.

"But I have seen pictures of people living in cold countries who wear scarcely any clothes."

"Yes, so have I," said Mrs. Harris, "but

you must not believe all you see in pictures. If they had been taken in a photograph that would have been all right; but I do not believe all I read about other lands, and I am sure I do not believe one half of the pictures I see."

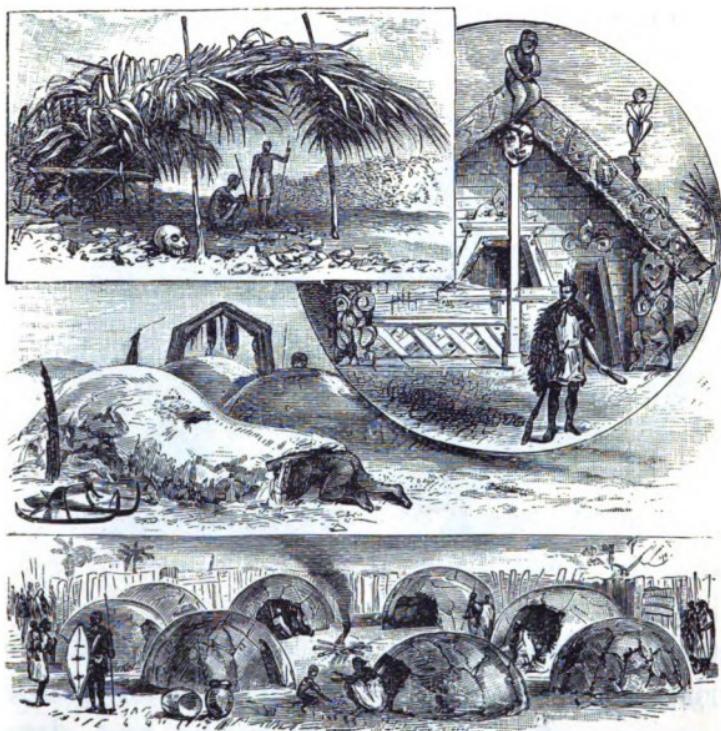
"Oh! I do not know that," said her hus-



band. "People who travel abroad, and who write books about the countries and people they see, often take photographs and draw pictures of the plants and animals and people.

"No matter who it is, or how many travellers write books and draw pictures, they nearly all tell the same tale.

"We know that the Negroes of Africa live in warm countries, and that they wear scarcely any clothes. So again the people of India wear but little clothing, and that is of the thinnest and the lightest kind.



"But I was speaking about the people who first lived on the earth. As I said, no doubt they lived in a warm place, and therefore did not want much clothing. Then, as they moved away with their families and

their flocks and their herds, and came to colder parts, they would cover themselves with the woolly and hairy skins of the animals they caught and killed.

“And even whilst they lived in warm regions of the earth, they wanted some protection from the fierce rays of the sun.

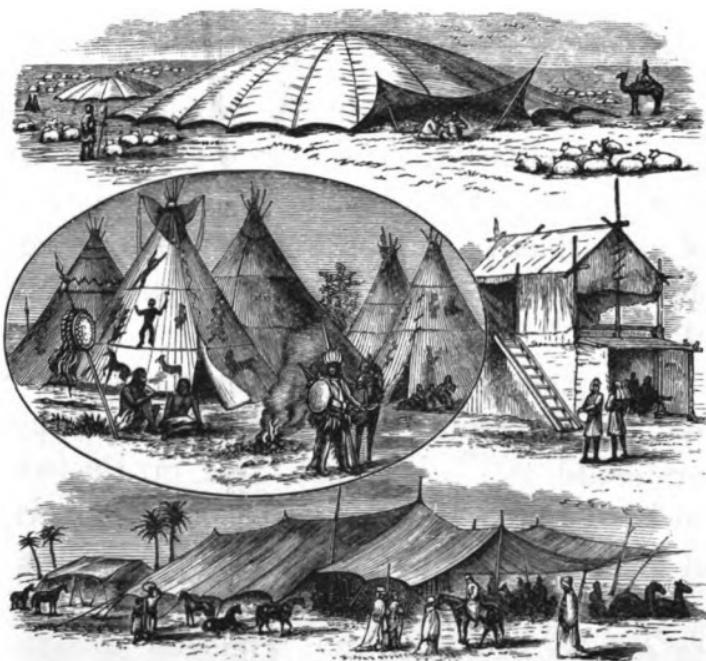
“They would soon find themselves cooler and more comfortable in the shade of a tree or a wall, than when they were out in the broiling sun. And so they would also soon find out that a skin, hung up as a screen, would keep off the sun’s rays and keep them cool.

“And then as people began to get more sensible they would soon see that, although they could not carry the tree or the wall elsewhere to shelter them, they could carry and hang up their animals’ skins for shelter.”

## **CAVES—TENTS—CLOTHES**

“From this simple screen from the heat they soon learned to make tents ; and no doubt, later on, they thought that, instead of having one tent for all, it would be far better for each to have a tent to himself.

"Thus it came to pass that in time each man carried his own tent and used it as clothes for himself, which would protect him both from the heat and the cold, and shelter him from the wind and the rain."



"And so I suppose you look on our houses as you look on clothes, as things to keep us dry and warm or cool," said Mrs. Harris.

"Of course, I do," said Mr. Harris. "A house shelters us from the cold in winter and from the heat in summer, and our clothes do

exactly the same. But our house is a fixture ; whilst our clothes we carry about with us for protection.

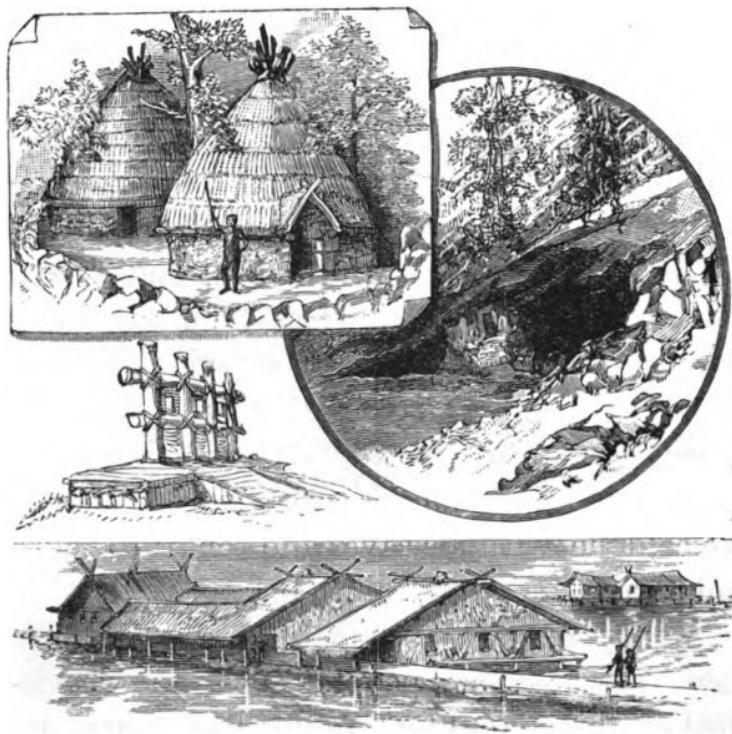
“ And it is for this reason that men and women, and boys and girls, sleep under cover in all lands. The early inhabitants of Britain lived and slept in caves, which they closed at night against the wild animals which lived among them. In the summer they were cool, and in the winter they were warm, and in both they were a protection for them.

“ In all countries, and in all times, man makes the best of things as he finds them. When he found himself scorched and burnt by a powerful sun, he lightly clothed or screened himself from it. And when, in other lands, he found himself frozen or chilled by the cold, he, with his caves and tents, and skins and clothes, screened himself from it also.”

Whilst Mr. Harris had been explaining how it was that people took to wearing clothes, his daughter Maud had come and seated herself on the seat beside him.

When he had shown that man’s early house was a cave, Maud said that it was not so long ago that a man came from Turkey to see what he could of the manners and customs of the people who now live here.

This man, when he returned home, actually told his fellow-countrymen that the British people dug holes in the ground, covered them with stones, and lived in them.



“How could that have been?” said her mother.

“Why, do you not see?” said Mr. Harris. “He spoke of the cellars of our houses, the stone walls and the stone roofs. Bricks you

know are really stones, and so are the slates and tiles.

“So the Turk was not so very wrong after all. No doubt our houses are somewhat like the holes and caves in which the ancient Britons lived in times gone by ; but they are far more comfortable.”

### **HEAT—FIRE—SUN**

Having sat for over an hour on the garden-seat, and the sun having set, both Mr. and Mrs. Harris began to feel chilly, and they went into the house.

There there was a fire, for Mr. Harris did not care to sit in a cold room, lest he should take cold and have toothache, or some other pain which often follows sitting about in the cold and damp.

Whilst they sat by the fire, Maud did her home-lessons for the next day ; but her father and mother went on with their conversation on heat and cold and clothing.

“Do you know,” said Mr. Harris, “why heat is coming to us from the burning coal ?”

“Because the coal is hot, I suppose,” said his wife.

“ Yes, just so,” said Mr. Harris ; “ but do you know where the heat first came from which the coals are throwing out ? The coals in the scuttle, you know, are cold, then how is it that they can throw out heat ? ”

“ Because the wood sets them on fire, I suppose,” said his wife.

“ Yes, of course,” said her husband ; “ but if there were no heat in the coals they could not throw it out. You cannot get anything out of a thing unless it is there.

“ In the sunshine the sun warms you,” said Mr. Harris, “ and the sun throws out heat because it has heat in itself. It is really burning.

“ So in the same way burning coals throw out heat, because they have it. You can burn all parts of every animal and every vegetable, and all parts when they burn throw out heat.

“ If you burn the limbs of a tree, you get heat ; and if you burn its leaves, you get heat. So if you burn the face, or the horns, or the hair of an animal, you get heat thrown out also.

“ During the winter, plants of all kinds, big and small, grow but little, because the

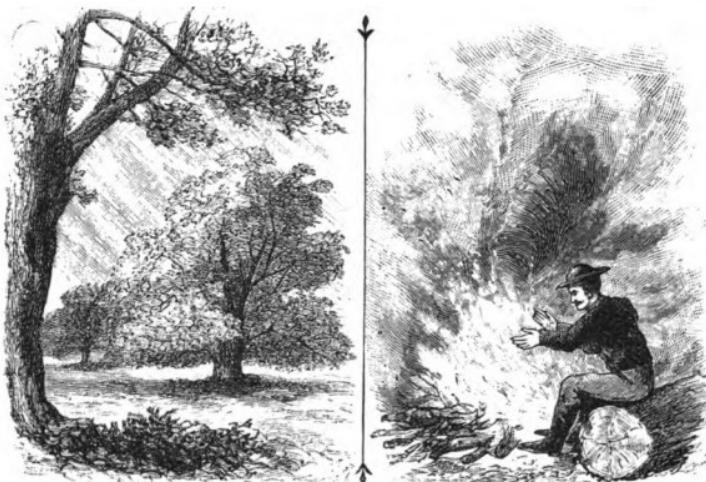
sun does not much warm either them or the air or the earth. But, when the summer comes, and the earth and air become warm, then plants begin to grow.

"Really, our trees and flowers and vegetables are made or built by the sun. You know a steam-engine will not work without steam, and steam is water into which the engine-man puts heat. As soon as the water gets hot it turns to steam, and you know steam can make things move, as you see when the cover of the kettle moves up and down when the water is boiling.

"The water takes in heat from the fire, which causes the cover of the kettle to move. And so in the same way a tree takes in the heat of the sun, and grows. The warmth of the summer makes its parts move and grow larger and larger. So in a large plant the sun has done a deal of work, and put in a deal of heat.

"When a plant is cut down and dried it can be burnt, and then most of the heat, which the sun had put into it when it was growing, is thrown out from the burning wood, and warms people and things who may happen to be near."

## HEAT OF THE BODY



"In the same way," went on Mr. Harris, "the paper which is used to set fire to the wood has been built up by the heat of the sun, for paper is made mostly from cotton rags, and cotton was caused to grow on plants in hot countries by the heat of the sun.

"And not only the paper and the wood, but the coal also, can throw out heat, which was placed in it by the sun in times long gone by.

"Coal was once part of plants, and these plants also were made by the sun. So really, coal, which once grew as plants, was made by the sun's heat, and this heat it throws out again when we burn it in our stoves and grates.

"Many other things besides coal throw out heat. Oil and grease, and all parts of animals and vegetables, can be burnt and made to throw out heat.

"It is very easy to see that plants contain the heat of the sun ; but it is not so easy to see that animals contain it also.

"If, however, we put fat on the fire, it flares and throws out much heat. Animals feed on plants, and if the plants contain heat, the animals which eat them contain it also, and therefore fat contains heat.

"If you take a pig and fatten it on corn, the corn is turned to fat ; and if you put the fat on the fire, you get the same heat which you would have had, had you put the corn on the fire instead.

"So, when you look on the gas-lamps burning in the streets at night, you only get some of the same heat and light which were used to grow the plants, from which the coal-gas was afterwards made."

"But what has that to do with clothes ?" said Mrs. Harris. "The sun does not make me nor the children grow."

"Perhaps not," said her husband, "but it has a great deal to do with clothes for all that. Clothes not only keep away the heat of

the sun from us, but they keep a great deal of heat in us. They stop the heat of the sun from reaching us, and they stop the heat of the body from leaving us.

"Clothes, like walls and roofs, stop heat. All three keep out heat, and they all three keep in heat. That is why houses and tents and clothes keep us cool in summer and warm in winter."

"But I do not see," said Maud to her father, "how the body gets any heat at all if we keep in a cold place. I keep warm even when I am bathing in cold water."

"Perhaps you do not see why or how," said her father, "but it is not hard to understand. Coals are made from plants, and the air causes the coals to burn. So in the same way our flesh is made from plants, and the air causes us to burn also, and that is why we keep warm.

"The more air you blow into a fire the faster the coal burns and the hotter it gets; and, in the same way, the faster you breathe, that is, take in air into the body, the faster you burn and get warm. That is why we get hot when we work or run fast and breathe more rapidly than usual."

## CONDUCTION OF HEAT

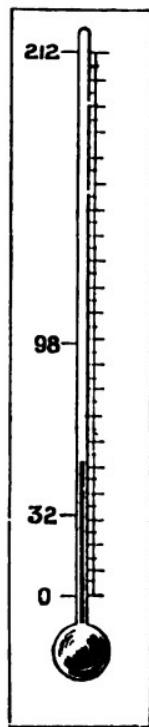
"How is it," broke in Mrs. Harris, "that all clothes are not alike. They do not all keep us equally warm. A blanket keeps us warmer in bed than a sheet, and a woollen shirt is warmer than a linen or a cotton one."

"Carpets are warmer than floorboards; and I would rather sleep between blankets than between linen sheets in the cold winter."

"Perhaps you would," said Mr. Harris; "but it does not follow that that is the best thing to do.

"When I went to school we had a thermometer hanging up in the room, and I believe one is now placed in every school. By means of this you can tell whether the room is warm or cool, or too hot or too cold.

"A great man once said, 'A photograph cannot deceive.' I am not so sure of that, but a thermometer cannot tell you wrong or make a mistake. It must tell the truth. If you had four thermometers, and wrapped them



up all night in four separate pieces of cloth, say wool, linen, silk, and cotton, you would find in the morning that the thermometers would say that all four were equally warm.

"If, in the morning, when you get out of bed, you walk about the bed-room you would say that the floor-cloth, the carpet and the floor-boards were not equally warm; but the thermometer would tell you that they were, and the thermometer would tell you the truth, whilst your feet would not."

"How can that be?" said Maud. "If we want to know whether things are hotter or colder than other things, we touch them with our hands; and if we touched them with our feet, it would do just as well; at least, it seems so to me."

"Oh no," said her father. "If you place a basin of water in a bed-room all night, and you put your hand or your foot into the water in the morning, you might, and probably would, say that the water was colder than the carpet. But the thermometer says it is not colder than the carpet."

"But the thermometer may be wrong," said Maud.

"No," replied Mr. Harris, "it is you who may be wrong and not the thermometer.

You have nerves and the thermometer has not, and things which have nerves do not always tell the truth. Nerves often deceive their owners.

"The fact is, all things do not let heat pass through them equally well. Through some things heat travels more slowly than through others. Those things through which heat travels fastest feel colder to us than things through which heat travels or goes more slowly. Heat travels faster through iron than through carpet, and that is why we think and say iron is colder than carpet.

"So, in the same way, heat goes more quickly through linen than through wool. So, if we put our hands on linen sheets, we say they are colder than cotton sheets because they feel colder, that is because heat runs away from our hands through the linen sheets faster than it does through the cotton sheets.

"And so it is with our clothes. If we wanted to allow the heat of the sun to reach our skin we should wear no clothes; but, as we must wear clothes, we should have them made of cloth which would allow the heat of the sun to pass through easily.

"If, on the other hand, we wished to

prevent the heat of the sun from reaching the skin, we should have our clothes made of cloth which would not allow the sun's heat to easily pass through.

" But, in the winter time, we do not much mind the heat of the sun. We are then more careful to keep in the heat of the body, so that it may not pass away easily from the skin through the cloth into the air.

" Things which let heat pass easily through them are said to be good *conductors*; and things through which heat cannot easily pass are called bad conductors.

" No cloth is a good conductor. All clothes are bad conductors; but like some people they differ in their badness. It is not a case of good and bad; it is a case of bad and worse. The metals are the only good conductors.

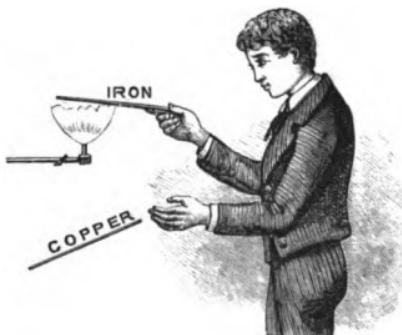
" You cannot readily burn metals, because heat goes easily through them; but you can readily burn plants and animals, as they do not allow the heat to run away freely through them. Things which you cannot easily burn, or melt, or crack with heat, are good conductors. Things which you can easily burn are bad conductors. You can at once burn any kind of cloth, so all kinds are bad conductors.

"So, for the same reasons, all our clothes are bad conductors. They are all made from plants or animals, so they must be bad materials for heat to travel through.

"Any boy or girl can easily prove this for himself or herself. Take a metal hair pin, and take a thin piece of wood of the same length and size. Hold both the metal hair pin and the wood in a candle or gas flame. The heat will not travel through the wood ; but it will burn it instead. The heat will, however, soon go through the metal. It will not burn it ; but the holder will soon be compelled to drop it or put up with a burnt finger and thumb.

"Or, hold a piece of iron-wire and a piece of copper-wire in a gas flame, and you will be taught the same lesson. The copper will get hot quicker than the iron, because it is a better conductor.

"Thus when people speak of clothes as being good conductors, they say that which is not true. Wool does not allow heat to



go through it so easily as linen does, and it is therefore a worse conductor; but linen is not a good conductor for all that."

## RADIATION—COLOUR

"Father, how is it," said Jack, "that in nearly all hot countries people wear white clothes, whilst in this part of the world most people wear black or dark ones?"

"Well," said Mr. Harris, "an American once explained that very nicely in this way. He cut four pieces of cloth six inches square. They were black, blue, red, and white; and on a fine, sunny, winter day he laid them on the snow in his garden.

"At the end of an hour he found that the dark piece of cloth had sunk deep in the snow, whilst the red had not sunk far, and the white had not sunk at all.

"From this it is very plain that the dark cloth had allowed much heat from the sun to pass through and melt the snow underneath, whilst the white cloth had declined to let it pass through.

"From this one can easily see why people, who live in countries where the sun shines

fiercely, wear white. If they wore black the heat would pass through and almost melt them. And we can also easily see why those, who live in this part of the world, wear dark clothes. They want, in the winter, to get all the heat they can from the sun, and, as dark clothes allow the sun's rays to pass through, they act wisely.

“In the summer time, however, the inhabitants of these islands do not want to be warmed by a fierce sun; so then they wear white and light coloured garments as the people of the tropics do.

“But, although the colour of the cloth makes a great difference to the heat taken in from the sun, it makes no difference to the heat lost from the body. As we all know, the body and the food in the body are slowly burnt by the air we breathe. For this reason the body gets warm; and, as the warm skin touches the clothes we wear, the heat slowly travels through from the inside of our clothes to the outside.

“From the outside it passes away into the air, so that we get cold much in the same way as a hot tea-pot, or any other hot thing gets cold.

“The colour of the clothes, however, makes

no difference to this loss. A white coat loses as much heat as a black one, so that, if we do not trouble about the rays of the sun, we may as well wear white clothes in winter as black."

"I have noticed now and then," said Jack, "that they sometimes whiten the roofs of buildings in the summer. I suppose this is to keep them cool."

"Just so," said his father; "a white roof does not absorb or take in so much of the sun's light and heat as a dark roof would; just as white clothes do not absorb or take in so much of the sun's light and heat as dark ones. The white clothes keep us cool, and the white roof keeps the building cool. We say white things reflect or throw back into the air more rays of the sun than dark things."

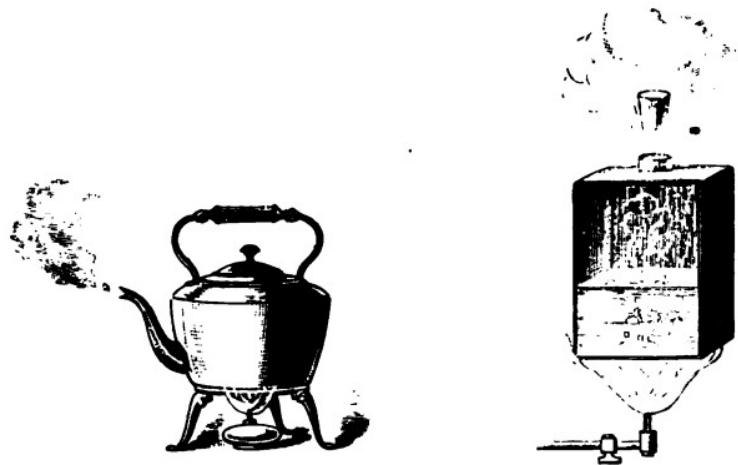
## **PERSPIRATION**

"But there is another thing besides the passing of heat through cloth, and its radiating or throwing it off into the air, that those, who make it for our clothes, have to think of.

"The skin of the body is always damp.

Sometimes it is a little damp, and sometimes very so, but it is always damp. This damp, or water, comes through the skin from inside the body, and if it did not dry away into the air, we should soon be very wet.

"About a pint of water comes through the skin daily. Now, every one knows that water



will dry up and pass into the air at nearly all times.

"A wet cloth hung before a fire dries. The water turns to vapour, and passes away into the air. But if water cannot get heat it will not dry up, as we call it: it will remain where it is. To dry away or evaporate, it must have heat.

"The water put into the kettle boils away if we put it on a fire or a gas stove. In the same way wet streets dry up when the sun shines on them, and we dry in the same way. In the case of the kettle the heat is supplied by the fire; and with the wet street the heat comes from the sun or the air, or from both.

"In the case of the damp or perspiration on our skin, however, the heat to dry it up is taken from us; so, if the perspiration dries up very rapidly, we shall lose heat very rapidly, and we shall not only feel cold, but we shall very likely catch a cold.

"It is for this reason that we wear wool next our skin. The wool absorbs the perspiration, and dries very slowly. If we had linen next our skin it would not hold the perspiration long, but it would allow it to dry up more quickly, and the heat to do this would be taken from us more quickly. So, if the drying be rapid, our loss of heat would be rapid, and our feeling of cold would be great.

"You can easily prove this for yourself. If, after you have washed and wiped your hands, you wave them about in the air, your skin will feel cold; but if instead of

water you put some spirit or scent on your hands, and then wave them about, they will feel colder.

“The water on the skin takes heat slowly from the skin to dry itself off, therefore the hands feel cold ; the spirit takes heat more rapidly from the skin to dry itself off, therefore the skin feels colder.

“Wool and cotton are better materials to wear next the skin, both in summer and winter, than linen. They are worse conductors of heat. They better absorb the perspiration from the skin : they hold it longer, and they dry less rapidly. As a result, they do not take heat rapidly from us, and we look on them as warm materials ; but this is because they do not allow us to rapidly get cold.

“Wool, however, is a worse conductor of heat and a better absorber of damp than cotton, therefore it is more suitable for inside garments than cotton, because it better keeps in the heat.”

“But after all,” said Mrs. Harris, when her husband had explained all these things, “people only imitate other animals in clothing themselves. Birds have feathers, sheep have wool, rabbits have fur, cows have hair, and all

those things are warm, that is, they do not allow the heat from the bird, the sheep, the rabbit and the cow to pass easily away. The tortoise has a thick crust to keep him warm, and even the snail has a house, or cave, which he carries about with him."

"Yes," replied Mr. Harris, "that is so, and men and women, as you say, only imitate other animals in their clothing and houses.

"But people do not shelter themselves from the cold and the heat simply because they feel more comfortable. There is a much more important reason than that. A steam engine, to work well, must be made so hot and no hotter. If you make it hotter it bursts, and if it gets colder it will not work.

"And the human body acts in the same way. If it gets too hot the person has a fever, and, although he does not burst, he dies. If, on the other hand, he gets too cold, his heart stops beating, and he dies.

"The body is a machine, and the parts inside must be kept just warm enough and no warmer. It is to do this that clothes are worn. In the summer they screen off some of the sun's heat, and keep the body cool; and in the winter they keep in some of the heat of the body, and keep it warm.

"If a thermometer be placed in the mouth, or under the arm, it rises to 98 degrees, so that the warmth or temperature of a person in good health is said to be 98°."

## MATERIALS FOR CLOTHING



"Friday at last," said Maud, as she came into the room where the rest of the family were waiting for their breakfast one morning towards the end of the year.

"Why are you so anxious for Friday to come?" said her mother.

Before Maud had time to speak, her brother Jack had begun to explain that the Christmas holiday would begin that afternoon.

Both Maud and her brother had been looking forward for some days to the pleasant time they were going to have skating and sliding, for the frost had already set in, and, if it continued, the ice on the lake in the Park would soon be thick enough to bear them.

"Before you begin to think of that," said Mrs. Harris, "you must remember, Maud, that your sister Bessie and I will be very busy cleaning and decorating the room, and preparing and cooking the Christmas pudding and other nice things. You must help us, and then I may find time to go out and buy the material for your new dress, and also the materials for Bessie's outfit. She will want several new things now she is leaving home. You may be invited to Edith Field's party, and you will be able to accept the invitation if your dress is ready."

"I suppose I am going to have a new suit too," said Jack, "for I may be invited also."

"That depends on how you behave," said

Mr. Harris. "I begin to think that you boys want your clothes made of something stronger than tweed or serge; and as to boots—well, leather is hardly of any use, if you are going to be sliding all the winter."

When breakfast was over the children prepared for school. As it was a very cold day, Maud put on her thick jacket and felt hat, for, since she had heard about the body being kept warm by wearing certain kinds of material, she had been careful not to wear her summer things during the winter.

During school that morning, Maud was wondering what her new dress would be like, and when Miss May happened to ask her a question, she had only a very faint notion of what her teacher had been saying.

As soon as school was over in the afternoon, Maud hurried home to help her mother, so that she might the sooner get her new dress for the party.

As the days were then very short, for it began to get dark about four o'clock, Mrs. Harris thought it best to wait till the next day, so that they might have daylight for choosing the material.

## WOOLLEN GARMENTS

That night, whilst sitting at their needle-work, Mrs. Harris said to her daughters, "Bessie will want some underclothing as well as some outer garments. I wonder what I had better get for that purpose?"

"I know," said Maud; "for last week Miss May was showing us how some garments got warm and kept warm for a long time, while others soon lost their heat. As in winter we want to keep in the heat of the body, it is well to know which material is best."

"Tell me which Miss May considered the best," said her mother.

"For this country, Miss May said that woollen material was best, because it kept in the heat of the body, and, in addition, was porous. Silk was good for keeping in the heat, but it was not so porous.

"I can remember quite well how Miss May proved that wool was better than cotton. We had two stone bottles of hot water, one had a calico covering, whilst a woollen covering was on the other. At the end of an hour Miss May poured out some water from each,

and Edith Field said, after trying the water with her hand, that that from the bottle with the woollen covering was the warmer of the two."

"Yes, that is quite right," said her mother, "and because wool best keeps in the heat, we wear flannel next to the skin.

"Wool has other advantages over cotton and linen beside that of its power of taking in and holding heat. It is more porous, allowing air to pass slowly to and from the skin; and it absorbs the perspiration without its surface becoming very wet. Considering our ever-changing climate, it is well to protect the body from sudden chills by preventing the too rapid escape of heat."

"We read something about the manufacture of wool in our History Readers this morning," said Maud. "It was this:—One of the kings of England who did much to help the woollen manufacture, wished to show how important he thought it ought to be. So he caused a bag of wool to be placed in the House of Lords, on which the chairman was to sit. Is that true, mother?"

"Yes," said Mrs. Harris, "and the seat is now known as the Woolsack.

"There are different kinds of woollen

materials ; some are used for outer garments, and some, such as flannel, are used for underclothing. The quality of flannel depends largely on the kind of wool which is used. The soft, yellow kind is called Saxony flannel, and is chiefly used for making garments to wear next to the skin. It is rather more expensive than other kinds because of its colour and texture, its surface being fairly smooth, and therefore not very irritating to the skin.

"I must get some Saxony flannel for you, Bessie," said Mrs. Harris ; "and I daresay I shall have to pay from tenpence to two shillings a yard for it.

"Another kind of flannel now much used," said Mrs. Harris, "is the Welsh or blue flannel, which is more durable than the Saxony, and is used for making petticoats. The best of its kind comes from Welshpool in Wales. The price varies according to the coarseness or fineness of the make. You would pay about one shilling and sixpence a yard for the best, while the narrower, coarser, and lighter kinds can be bought as cheap as tenpence.

"All flannel shrinks more or less, and the cheaper kind will be the dearer in the end, because it shrinks most. When you go to

your laundry class, Mary, you will learn how very careful you have to be in washing woollen garments, so that they may not shrink and become hard."

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"Mother," said Maud, "we have just begun our knitting for the new school year, and four girls in my class are going to knit some undervests. Are they healthy?"

"That brings us on to another use for wool," said Mrs. Harris. "Sometimes the fibres are spun into yarn, and used to knit gloves, stockings, socks, and vests. You know how dangerous it is to have cold or damp feet, so you will easily see why we ought to wear woollen stockings. I will get some wool to-morrow, and you shall knit a pair for Bessie. You might ask Miss May which would be the best kind of wool, and how much I shall want for half a dozen pairs, when you go back to school."

"I know what we are using now," said Maud; "I am using Beehive wool, which you buy in two oz. packets of ingrain colours for sixpence-halfpenny. Some girls are using Scotch fingering, which is sold in bundles weighing about three quarters of a pound,

and which cost about two shillings if coloured. The girls who are making Miss May's vests are using vest wool, which costs about four shillings a pound ; and the pretty babies' boots are made with Andalusian wool, costing about three shillings a pound."

"Now as to the vests," said Maud's mother, "I know that some people prefer to wear knitted ones to those made of flannel. If made of fine, soft wool, with coarse needles, they are just the thing to wear next the skin. They answer the same purpose as ordinary flannel vests by keeping in the heat, absorbing the moisture, and allowing air to pass to and from the skin ; but like the flannel garments, they shrink when they are badly washed. Of course, it would not do to wear vests knitted with badly dyed wool, for the results might be serious.

"Have you ever thought how largely wool is used in the manufacture of many of the best known materials, which are used for outer garments ?" went on Mrs. Harris.

"You remember those dark grey dresses which you and Bessie had last winter. They were made of pure wool, and the material was called tweed. If you go upstairs and look in Bessie's box, you will find a piece

of the same stuff; for I bought a little extra to be used for mending. Then I will show you how to find out whether a material is made of wool only, or whether it is made of wool and cotton."

Maud quickly went up to her sister's box and brought the tweed to her mother, who began at once to pull out the threads from the raw edge. Mrs. Harris was very careful to pull out some of the threads which went the length of the material as well as some which ran across the width.

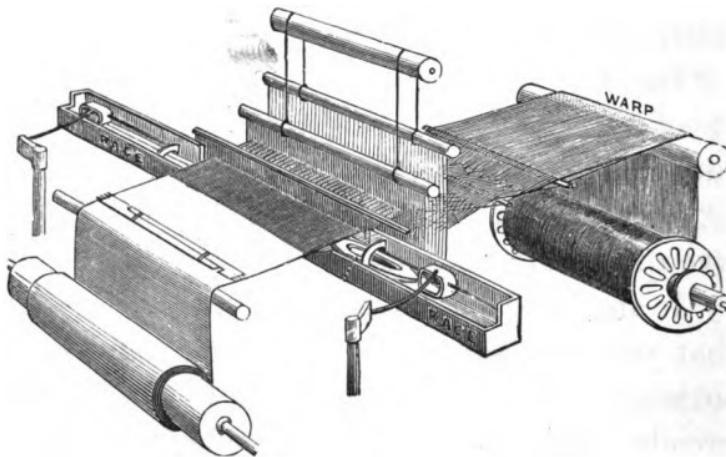
"Do you know the name given to the set of threads which go the length of the stuff?" said Mrs. Harris.

"I remember Miss May telling us, but I have quite forgotten now," said Maud.

"I am afraid that is often the case with what you and Mary hear at school," said their mother. "Listen whilst I tell you. The threads which run the longway of the piece are called the *warp*; the set of threads which runs across and interlaces with the warp is called the *weft*. If you hold a piece of flannel up to the light you can easily see the threads; and I daresay you have noticed them when you have been trying to find the selvedge of a piece of calico, on which you were going to stitch.

"Mary, give me a little piece of the wool with which you are knitting, and watch while I break it.

"Now break a piece of cotton from this reel, and tell me if you notice any difference between the breaking of the wool and the cotton thread."



"Why, yes," said Mary at once, "the cotton snapped and broke off quite sharp, whilst the woollen fibres seemed to stretch and then pull apart from each other, leaving a ragged edge."

"Try these threads which I have unravelled

from this grey stuff, and tell me of what you think they are made," said her mother.

Mary tried them, and found that they broke just like the knitting wool did.

"That is one test for woollen goods, but there are several others. The best test for the quality is to tear a strip of the material. If it be made of pure wool some force will be required to pull the threads apart; but if it be made of shoddy, it will tear much easier.

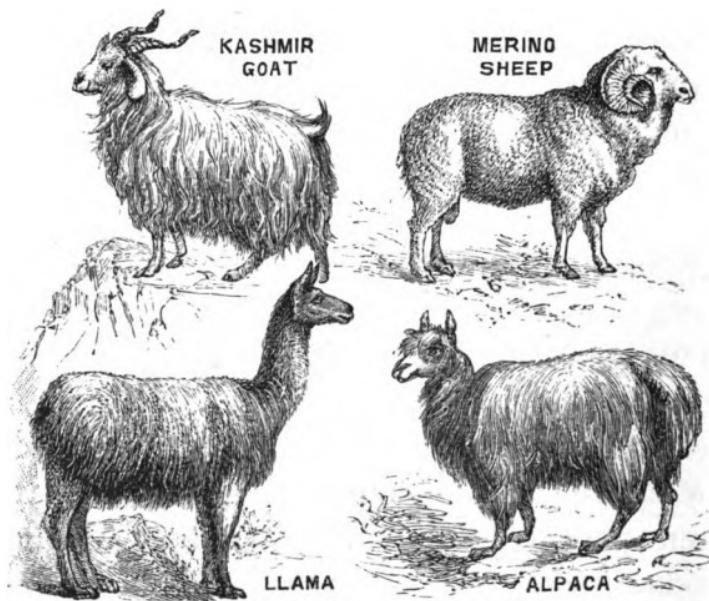
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"Shoddy is made in the following way:— Worn-out woollen garments are collected from all parts of the country, and then, together with old woollen rags of all kinds, are, by means of a machine, torn up into shreds. These are then made into new cloth, and often passed off among the best woollen goods.

"Have you ever seen your uncle try the quality of the different stuffs?" said Mrs. Harris. "He is in a woollen warehouse: so of course he knows. He takes a small piece of the cloth between the first finger and thumb of each hand, and holds it so that the tips of the thumbs just touch. He then quickly, and with some force, tries to tear the

threads apart by the pressure of his thumbs. If the stuff tears easily it is probably shoddy.

"For hard wear for men and boys a stronger kind of tweed than this of your dress is required," continued their mother. "I think I must get a new tweed suit for



Jack, or perhaps I had better get a serge, for a good serge should be made of wool only, and will last him all through the winter."

Besides the materials which have just been mentioned, woollen goods include—

**Cashmere**, which is made from the very fine hair of the Thibet goat.

**Alpaca**, which is obtained from the silky fleeces of the llama and alpaca ; and

**Merino**, which is now usually worked up with cotton.

Flannelette, which of recent years has much come into use, is not, as its name seems to imply, a kind of flannel. Flannel is made of wool ; but flannelette is made from cotton, the fibres of which have been so prepared as to make the surface of the material appear and feel woolly. It is much cheaper than flannel, and on that account is much used in its place. At the same time it should be remembered that it neither is wool, nor does it answer the same purpose as wool.

When new, flannelette appears to have, as has been already stated, a woolly surface ; but after it has been worn and washed the cotton begins to show itself.

Dyers, from years of practice, can easily tell whether a material is made of wool or no. For woollen garments they use a different dye from that which they use for cotton ; as wool will not take the dyes which they use for cotton.

The closely-woven cloth, which is woven for the making of black coats and vests, is called broad-cloth ; and from what was said

on weaving in the book for Standard III., it is easy to see how the different kinds of tweeds and serges are made. Much of the wool, which is imported into this island from abroad, is finer than that which we produce ourselves. The fibres of Australian wool and of the wools from hot, dry countries, are much finer than those of British wool, so that much of our wool being coarser and longer is used for worsted and flannels.

Most of the factories and towns in which woollen goods are made are in Yorkshire; but here and there wool is made into cloth and flannel in other parts of the country.

## COTTON GARMENTS

“When Miss May was telling you the names of the materials used for clothing, did she tell you which was considered to be the best after wool?” said Maud’s mother.

“Yes,” said Maud, “I believe it was cotton; for, although silk is warmer, it is expensive, and does not easily absorb damp. Cotton is cheap, keeps in the heat of the body, and absorbs damp fairly well.”

Cotton does not, however, soak up damp

from the skin anything like so well as wool. You know if you get very hot and wet, and then sit or stand about, cotton garments, if worn next the skin, become very wet and chilly, and you are very likely to take cold.



But, although cotton is not so suitable as wool in this country, where the weather is so often changing, it is very useful in warm countries, where people are not so likely to take cold.

“One day last week,” said Maud, “Miss

May wanted a few of us to practise gathering and putting on bands; so she sent Edith Wood out for a few yards to cut up. As soon as she came back, Miss May looked at it and said it was a very poor calico, although to us it looked very nice and fine. This is the way she proved it.

"Holding a piece of the calico between the finger and thumb of each hand, she rubbed one part against another, and a fine white dust seemed to rise from it. When we looked at the piece which had been rubbed, it seemed to be quite different. Instead of looking fine and smooth, the threads were coarse and unevenly woven; and when we afterwards tried to work on the calico, we found that it was only after great trouble that our needles would go through it. Several of the needles were broken, and after we had stroked down the gathers, we thought the calico was very poor and thin.

"Miss May explained to us that the calico owed its good appearance to the *dress*, which had been added to deceive people as to its quality. The dressing is a paste made of starch and gum, and completely covers over the imperfect weaving."

"In that case," said Mrs. Harris, "I should much prefer to buy unbleached calico."

"Why, what is that?" said Maud.

"I daresay," replied her mother, "you have seen in the drapers' shops, a brown-looking calico which is rather cheaper than the white. The brown calico is none the worse for its colour; it is stronger and wears better, and after frequent washing becomes white. The whiteness of the other calico is due to its having been bleached.

"You remember how the colour came out of that pale blue dress which you wore at Margate last summer. The sun's rays were so strong that gradually the blue threads became bleached and looked white.

"Years ago, calico used to be bleached in much the same way—that was by exposing it out of doors to the rays of the sun.

"If you spill ink on a white tablecloth you know you can get it out with salts of lemon. The salt has the power of bleaching the stained linen, and making the ink spot colourless; but it leaves the threads much weaker."

The old way of bleaching calico, by exposing it to the rays of the sun and keeping it damp, has nearly died out. It was far too slow for this busy age.

Now calico is bleached by chemists, not by the chemists who keep shops, but by chemists who work in factories. With weak acids and chloride of lime and bleaching powder, the brown unbleached calico is soon made white.

Of course chemical bleaching is much more rapid than what may be called natural bleaching, but it is well known that the former very much weakens the material. Therefore, unbleached calico is much stronger than cheap white calico, although people object to it because it does not look so nice. Years ago, hardly anybody used cotton for underclothing; but gradually it crept into use, and is now much more used than linen, because it is cheaper and warmer.

"I think," said Maud's mother, "I must get a good calico with which to make Bessie's garments. It will be cheaper in the end, because there will be more wear in it. The price will vary according to the make. If the threads are very fine and white and evenly woven, then the calico will cost about ninepence a yard; but this will depend on the part of the country in which you live. The coarser the calico the cheaper it is; and I shall take good care," said Mrs. Harris, "to test for a good one."

"How will you do that, mother?" said Maud.

"You will remember," she replied, "one way which you saw Miss May adopt to find out if the calico were dressed or not. Besides that, a good calico is smooth to the touch, and if you hold it up to the light you will see that the warp and the weft threads are of equal thickness, and that there are but few knots."

"Cotton is used in the manufacture of many different materials beside the bleached and unbleached calico which I have mentioned. The very pretty prints, of which we see so many, are all made of cotton. The pattern is either stamped on, as in cheap prints, or woven in, as in good ones. Prints are used for too many purposes to mention here; but you all know how cool and light print dresses are for summer wear, and how easily they can be made to look nice by careful washing.

"Calico and prints, unlike wool, shrink but little in washing; so but little extra need be allowed for this in making up the garments.

"Perhaps you would not think it," said Mrs. Harris, "but velveteen is made from cotton; and its smooth silky surface is only

due to the way in which it is made. Muslin, fustian, and some kinds of lace are also made of cotton.

"As cotton is so cheap it is often used to mix with wool; and because of this, some materials, such as winsey, which is half cotton and half wool, are cheaper than materials made of wool. Winsey is not used so much now as it was, although it is warm and stout and durable; for fashion has so changed, that stuffs of less wearable value, but of prettier patterns, take the place of the stronger materials."

## LINEN MATERIALS

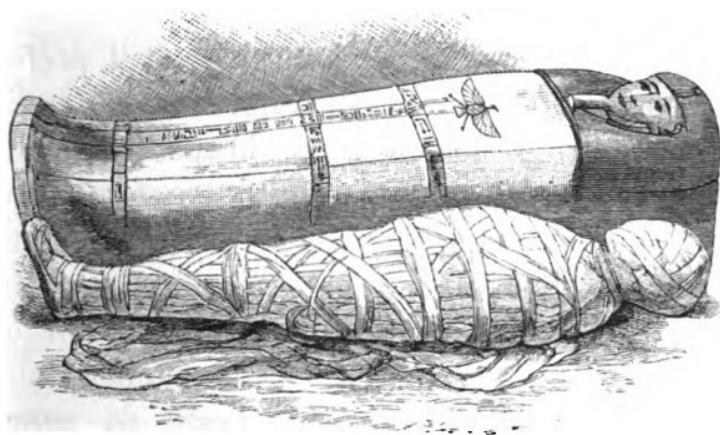
"Mother," said Maud, "if calico is so much warmer and cheaper than linen, why do we use linen at all?"

Mrs. Harris happened at this time to be making some new linen pillow-cases, so she said to Maud, "Take this piece of linen and that piece of calico and compare them."

Maud did as her mother requested her. She felt both, and was rather surprised to find that the linen was very much smoother than the cotton.

"That is one reason," said Mrs. Harris, "why I like to make my pillow-cases of linen. They are very smooth and comfortable for the head."

Another reason is that linen wears well, and lasts a long time. It was known in Egypt thousands of years ago; so it is not a new thing, as many people seem to think.



Many of the dead bodies of the Egyptians, which we read of in Bible times, have been brought to this country. The Egyptians did not bury their dead as we do, but they preserved them, so that they might keep them a long time. Bodies preserved and kept in this way are called mummies.

A few years ago, when a mummy was

being unwound, some linen was found among the coverings. Instead of falling to pieces as we should have expected it to do, it was quite strong, and had kept a good colour for over a thousand years. And in the grave of an ancient warrior, which was a short time since opened in Denmark, there was found a piece of strong linen which had been buried with him about three thousand years ago.

Some people who can afford it, still prefer to use linen for underclothing, because it is stronger than cotton, and keeps a better colour; and most people also prefer it for sheets and table-linen. For underclothing, linen is certainly cool and agreeable in summer. It is a much better conductor of heat than either wool or cotton; and, as it allows the heat from the body to more rapidly pass away than either cotton or wool, it may well be worn by those who can afford it.

Wool, however, should always be worn next to the skin. It more rapidly absorbs the perspiration than linen, which allows much to remain on the skin. As perspiration is mostly water, it takes heat from the skin to evaporate itself, and the loss of this

heat makes us feel cold, and very likely take cold.

Not only is linen used for table-linen, sheets, and underclothes, it is also used for collars and cuffs and shirt-fronts. The fine gloss which we get on these cannot be got on calico, and it can only be got on linen after what is called calendering—that is, making it smooth by passing it between heated iron rollers.

“Do you remember, Maud,” said Mrs. Harris, “where the best linen comes from?”

“Yes,” said Maud, “for we learnt it in our geography lessons this year. It comes from Belfast in the North of Ireland, and from Dundee in Scotland.”

“Linen is much dearer than cotton,” said Mrs. Harris, when Maud spoke of making some of Bessie’s garments with it. “You cannot get a good linen under ninepence a yard, and for the best Irish linens for fronts and cuffs, you must pay from one shilling and threepence to three shillings a yard.

“There are other linens beside those used for underclothing,” said Mrs. Harris. “You can buy black or grey linen with which to line bodices, for about sixpence a yard; but,

of course, the quality would not be the same as that of white linen.

"Then, again, there is a new material now used called *linenette*, which, like flannelette, is not what it appears to be from its name. It can be bought for fourpence per yard, and is used as foundation linings for dresses.

"There are many other things made from linen," said Mrs. Harris. "Our best pocket-handkerchiefs and finest underclothing are made from lawn, which used to be manufactured in foreign countries, but is now made in Ireland. Lawn, measuring about thirty inches wide, can be bought from ninepence to one and sixpence a yard. If you think, Maud, of the price of cotton you will soon see why most people use calico for under-clothing."

"Is cambric made from linen, mother?" said Maud; "because Ethel Stevens, who is in the fifth class, is making a pretty little dress for a baby, and she said it was made of cambric. I should think they would want something smooth and soft for a baby's dress."

"No," said Mrs. Harris, "like linen it is made from flax, and is rather expensive, costing about one shilling or one and sixpence a yard. This has led to the use of *nainsook*,

which is just as soft, and which is cheaper because it is made of cotton. Whilst talking of babies' clothes, perhaps you can think of some other material from which some of their garments are sometimes made."

"Do you mean diaper?" replied Maud.

"Yes, diaper is strong and will wash well, so it is used for children's pinafores," said Mrs. Harris. "Sometimes the linen is dyed, and we get coloured cambrics, diapers, and damasks, the latter being chiefly used for tablecloths. If the linen is not bleached, the value, like that of unbleached cotton, is not so great. Holland is linen made from the unbleached fibres of the flax plant."

## SILK MATERIALS

"I wonder, Maud, whether you remember anything of what your uncle told you last autumn about silk," said her mother to her one wet evening. "It was when we were all watching those little silk-worms which Jack had bought from one of his school-fellows."

"I expect I have forgotten a great deal," said Maud, "because uncle was talking about

silk, and silk-worms, and dresses, and France, and China nearly all the evening."

"I often think it very wonderful," said Mary, "that the soft and costly silk should be made from the cocoon of the silk-worm, and I feel very sorry that, after having done so much work it should be killed, so that we may be able to use the silk."

"All the silk-worms are not killed," said Mrs. Harris; "some are allowed to come

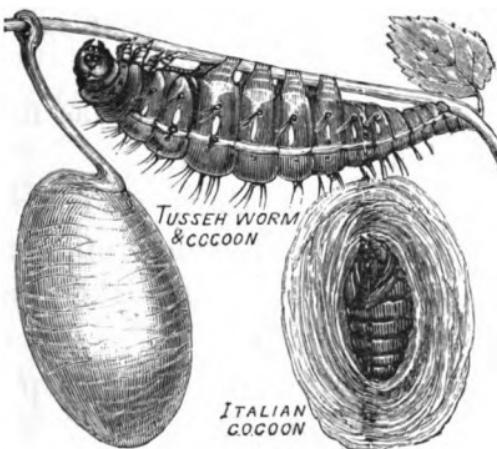


out of the cocoons in the form of moths, which lay eggs for future races of silk-worms. Have you ever seen the cocoons being unwound, Mary?"

"Yes," replied Mary; "I remember seeing them at the Exhibition some months ago. The girls who were unwinding the silk were very careful not to break the threads, and they had much trouble sometimes to find the outside end of the thread of silk."

"I think the Chinese must have been very clever to make silk and keep its manufacture a secret for such a long time," said Mrs. Harris. "Many people at one time thought that silk was the product of a plant like flax, from which linen is made."

"Is our silk made in China now?" asked Maud.



"No," said her mother, "we make some ourselves; but we also import a great quantity, because the silk-worm will not thrive in our climate.

"If we think of silk as an article of clothing it is like wool in one respect—it is a very bad conductor of heat. Perhaps you will say that, therefore, it is good to

wear next the skin ; but I know you would not care to pay the high price for silk, when wool is so much cheaper and better answers the purpose."

Silk is not able to absorb the perspiration without becoming wet ; and it cannot absorb much even then. Its surface, however, is smoother, and not so irritating to a delicate skin as most other articles of clothing.

Many materials are made from silk, such as *satin*, *velvet*, *sarsnet*, and *crape*.

"I thought you said velvet was made from cotton, mother," said Maud.

"No, I did not say that," said Mrs. Harris. "I said velveteen was made from cotton, and if you compare the two materials, you will see and feel a great difference. The pile of velvet is due to the raising of the warp threads, which are made of silk."

"I should never have thought that crape was made of silk," said Maud, "because it is so stiff."

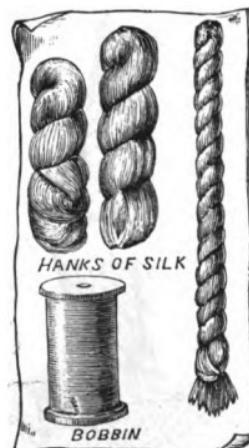
"The stiffness is due to the gum which is used to keep the threads in their place," said Mrs. Harris ; "but most things made of silk are soft and durable, and the greatest objections to them are their high price and their unfitness for rough wear."

"I think I shall buy some silk to trim your dresses," went on Mrs. Harris. "If Bessie has a dark-blue dress, I shall get a silk to match the colour of the material; but perhaps I shall get a lighter coloured silk for your dress. Silk is a splendid material for taking different dyes. You have only to look in the shop windows to see what beautiful shades and designs they get in silk materials."

"I should like some silk which is soft, and which will hang nicely on my dress," said Bessie. "Do you think a *Bengaline* will do, mother?"

"No," said Mrs. Harris; "it will be too expensive. I could not buy a good one under four shillings a yard; and if I do not get a good one, it will not wear well. I will get some *Surah* silk, which will only cost me about two shillings a yard. At the same time, I will get some sarsnet to put in the head lining of your new hat. That I can buy for one shilling and sixpence a yard; but I shall only want a very little."

Like cotton, silk is used in the manufac-



ture of mixed materials. You often see goods which look like silk ; but, if you examine the threads, you will find them like too many other things—not always what they seem to be.

## BOOTS AND SHOES



One Tuesday evening, as Mrs. Harris was sitting at needlework with her two eldest daughters, Jack rushed in and quite startled them. He had had his tea, and had been out again for an hour or so.

"We have had such a jolly slide," said he. "Last night, after school, Mr. Jones said that

we might pour some water over the playground as it was freezing, so that those who liked might have a slide in the morning. It has been freezing all day, and our playground is one sheet of ice."

"I am sure I hope this weather will not last long," said Jack's mother; "for you will soon wear out your boots at this rate. It would be cheaper for your father to buy you a pair of skates."

"I wish I could do without boots," said Jack, "for they are a great trouble. The laces are always breaking, and they are always wanting some repairs or other; and besides, you have to clean them in the morning, or get into a row at school."

"It would not do for you to leave off wearing boots now," said his father, who had just come in. "The skin of your feet would be too tender to tread on the ground after they have been protected by boots so long. With those who have never worn boots it is different, for the soles of their feet are hard, not soft like yours."

"How could we keep our feet warm and dry without them?" said Maud. "Your boots are stronger than mine, and yet they wear out much quicker, I am sure. I do

not know how you can wear such heavy boots."

Then, turning to her father, Maud said, "How is it, father, that although Jack's boots and mine are both made of leather, there is such a difference between them?"

"Your boots," replied Mr. Harris, "have their uppers made of soft kid, but Jack's are made of thicker calf-skin. His feet are stronger than yours; and, besides, he runs about in the wet and mud more than you do.

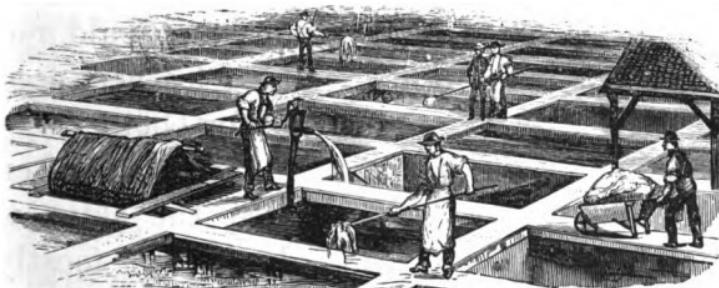
"You will remember that we use leather for boots, not only because it is strong, but because it is almost waterproof, and because it is a bad conductor of heat, and prevents the heat of the feet from rapidly passing into the ground.

"And you will also remember the many things which are done to hides and skins before they become leather, especially the tanning. It was only last week, when we were passing through South London in the train, that I pointed out to you a large tan-yard where the men were at work.

"There were the skins and hides which had been brought from the butchers, and those which had been imported from beyond the seas.

"They had been sorted out according to the use which was to be made of them. The thick hides, which were for the soles of boots, were by themselves, whilst the others were sorted out according to their thickness."

"Leather is a good protection to the feet, because it is strong and keeps out the water ; but it is not a perfect material for clothing. Good clothing should absorb the perspiration ;



but leather does not do this well. Good clothing should be easily washed, but the insides of boots and shoes cannot be thus easily cleaned. It should also slowly admit the air, but this leather does not do.

"The quality of leather," said Mr. Harris, "depends on the care taken during the tanning. The more the trouble the better is the leather ; and it is the same with leather as with the wool and cotton. I heard your mother say last Monday to your aunt, 'The

better the quality the higher the price ; the dearest at first is the cheapest in the end.'"

"I have seen some boots which have had very little wear, look quite worn out and unfit for use," said Mrs. Harris.

Like nearly everything else at the present time, the leather of boots often looks good when it is not ; so that it would be a good thing if we could wear them and try them before we buy them.

Good leather should bend, but should not crack. There are other kinds of leathers used as clothing besides these used for boots.

The skins of goats and sheep are often made into gloves, as are also the skins of numbers of rats. Kid gloves are mostly made from the skins of young calves and sheep ; but he would be a clever man who could say of what they are really made.

"Boys and girls and men and women must look very funny with those wooden clogs which they wear abroad," said Bessie. "I do not think they can be very comfortable."

"Nor do I," said Maud. "And what a terrible noise they must make, particularly when boys wear them. I much prefer our own boots and shoes."

The size of boots differs with the size of the feet they have to fit, and their shapes differ with the fashions. The soles of all boots in this country are made of leather, and so are most of the uppers; but now and then the uppers are made of cloth.

The soles are either sewn to the uppers or fastened to them by brass or iron pegs.

Boots are made as near as possible to the shape of the feet, or at any rate they ought to be. The uppers of boots come above the ankles and support them, so that people who have weak feet prefer them to shoes, which, besides being less strong, do not keep the feet so warm.

Boots may be made to fasten in different ways. Men's boots, as a rule, lace up in front by means of long laces which run through lace-holes made for the purpose.

Women's boots are generally made to button at the side; and the buttons are now put on with patent fasteners, so that they seldom give any trouble by coming off. Sometimes, however, ladies' boots lace up in front like those of men.

Shoes are really boots which reach only to the ankles. Like boots they are fastened by either laces or buttons.

Boots and shoes to be comfortable should be broad enough and long enough to allow the foot to keep its proper shape and size. Unfortunately, however, many people think a great deal more of fashion than they do of their comfort or their health, and they have their boots and shoes made too narrow and too short. On account of this their feet are squeezed out of shape, so that as years run on, their feet and toes become quite different in shape from what they ought to be.

Other boots and shoes are made to give what is thought by many to be a better appearance to the foot. They have very pointed toes and high heels, and the consequence is, that the toes become deformed by being squeezed to fit the boot, and the muscles at the back of the leg are strained because the heel is higher than nature intended it to be. By wearing these boots and shoes corns and bunions are often formed, and become a great trouble in after years ; and besides this, the blood is partly stopped from flowing freely along through the feet.

Special boots and shoes are made for special uses. For example, divers wear very thick, heavy boots, with lead fastened to the soles. Slippers, which are nearly always thin, are

made to wear indoors, and the uppers are made of thin leather or cloth or wool-work.

Special shoes with spikes are made for cricket; cloth shoes, having indiarubber soles, are made for tennis, whilst thicker leather brown boots are made for football.

In some countries the people protect their feet by covering them with skins, or plaited grass, or cloth made up as sandals; whilst some people, such as some of the natives of Africa, wear no boots or shoes at all.

Among the lower animals the horse is the only one which wears shoes, and these are made for him and put on by man. The owner would not, however, go to the trouble and expense if his horses walked only on the grass of fields. But the stony roads, which man makes to lead from town to town, would wear out not only his horses' feet but his own as well, if he did not put boots on his own feet and shoes on those of his horse.

Man also often strengthens his own boots with iron nails and iron tips placed at the toes and heels, so that the leather shall not wear away so fast as it otherwise would, on the rough paths and roads along which he has to walk.

## GLOVES

The evening after that on which Mr. and Mrs. Harris and their children had been talking about boots and shoes, Bessie, who had an evening out from her situation, called to see her father and mother. She had bought a pair of cheap kid gloves, and had split them across the back when she first put them on.

"I am glad I wear boots," said Maud ; "but I do not see the use of wearing gloves except to keep your hands warm. Yet no one seems to think a girl well dressed unless she wears gloves."

"They are not only used to keep the hands warm, but also clean," said her mother. "I do not mind wearing them at all."

"I wonder who started wearing gloves," said Jack ; "I expect people began to protect their feet before they thought of protecting their hands."

"The first gloves were made of rough skins, I expect," said his father. "Men who had to cut down hedges and prickly trees, would soon find that leather would be a good protection to their hands."

Gardeners now put on leather gloves

when they prune gooseberry and other prickly bushes ; and men, who have to handle rough wood, save their hands from splinters in the same way, just as those who clean grates protect their hands by gloves.

"I have often noticed," said Mr. Harris, "that anything new in the way of dress soon comes into fashion, and so I suppose some lady, who had seen a gardener wearing leather gloves, made herself a woollen pair.

"No doubt the early gloves were made without fingers, and then, as time went on, the changes took place by which gloves were made as we now find them."

"If I have to wear any," said Maud, "I should prefer to wear woollen or silk ones, for kid gloves are too tight, and cramp the hand too much."

"Well," said Mrs. Harris, "you have plenty of choice nowadays. They are made of almost all kinds of material. There are cotton gloves, silk gloves, woollen gloves, lace gloves, kid gloves, dog-skin gloves, and several other kinds.

"Some of these are thin and some are thick ; and some are lined with wool and fur to keep our hands warm during the cold days of winter."

"I am going to try and knit you a pair of gloves, mother," said Maud. "Our mistress has promised to show us how to make them; but I am afraid I shall never be able to make the fingers."

"I shall be glad to have them," said Mrs. Harris, "and if they are a success, perhaps you will be able to knit your father a pair, for he must feel the cold in his hands when he goes out early these winter mornings. I must confess that if my hands are cold I feel chilly all over.

"At the same time," continued Mrs. Harris, "it is a mistake to wear tight, kid gloves; for, if the hand is cramped, the blood cannot circulate through the hand freely, and it must become cold."

Gloves are often misnamed when called "kid" gloves, for many of the cheaper kinds are made of the skins of other animals—such as the sheep, the lamb, or the dog.

The skin is cut out in pieces of the required shapes, which are then sewn together. Most of our gloves come from France and Belgium, but a great many are made at Worcester and in the towns and villages near.

**FURS**

Whilst Mr. Harris was talking to his children about leather, the postman knocked three times. By this they knew that he had brought something which he either could not or should not put into the letter-box.

Mary and Jack both ran off to the door to see what he had brought, thinking and hoping that it was a present for them. It was near Christmas time, and their uncle generally sent them a present at that time of the year.

It was a large parcel, and was addressed

to Miss Harris, so Maud took it in to Bessie, hoping still that there might be something for her and Mary and Jack.

How impatient they were when the knot could not be untied, and both the younger ones wanted to cut the string. Mr. Harris, however, at last managed to untie the knot and take off the paper.

When they came to look into the box they saw more than one article, so they concluded that Uncle John had sent something for each. There was a set of fur for the neck and cuffs of a jacket for Bessie, a muff for Maud, a picture-book for Mary, and a good, soft pair of leather gloves for Jack. Their Uncle John happened to be in a fur warehouse, so he knew how to choose the best things for a present.

"How warm this muff will keep my hands," said Maud. "It is made of velvet, and bordering the open edges is some soft fur. The inside is lined with silk, so, as all three of these materials are bad conductors of heat, I shall expect to keep my hands very warm all the winter."

"What kind of fur is this?" asked Maud.

It had a pale, light brown colour, and the

hair was short and silky; so Mrs Harris could easily see that it was *beaver*.

"Mine is of much the same colour," said Bessie, "but the hairs are longer. I think mine is *sable*."

"Yes," said her mother, "it is; and it is very expensive. In very cold countries, such as North America and Siberia, people wear, during winter, clothes made entirely of fur, because fur will not allow warmth to pass quickly away from the body through it. Furs keep out the cold air, and keep in the warmth of the body.

"I should much like to have a sealskin jacket," said Mrs. Harris; "but they are so very expensive. I must make myself contented with a thick cloth jacket."

"Perhaps," said Mr. Harris, "I may be able to get you a *bearskin* cape; they are very warm, and always look nice. The most expensive furs are the Russian *sable* and *ermine*. The darker coloured sables are reckoned to be of more value than the lighter ones. Ermine, as you know, is only used to trim the most valuable robes, and the number of small black tails at one time showed whether the wearer were a great person or no."

"I think I should prefer a fur boa," said Mrs. Harris, "for they are more fashionable now than capes."

"I saw some boas hanging up in a shop window, and they were very cheap," said Maud. "They were marked at six shillings and elevenpence, but I did not like the look of them, as they seemed to be very ragged and untidy."

"Probably they were imitation bear's fur," said Mrs. Harris. "A good black or brown bear boa would cost, I daresay, from two to four pounds. I could also get a good muff to match the latter for about forty shillings. Sable muffs cost from one pound ten shillings to five pounds, but beaver muffs can be bought for thirty shillings."

To buy a really good fur one has to lay out much money at first; but, with care, furs last for many years, and can always be used up when some parts become worn.

Furs should be well wrapped up when not in use, and they should be occasionally looked at to see if the moth has got into them.

**HATS—BONNETS—CAPS**

“ Well, Maud,” said Mrs. Harris, “ did you enjoy the pantomime ? ”

“ Yes, I did, very much,” said Maud.

“ So did I ; what I could see of it,” said Jack. “ The singing was all right, because I could hear that ; but I could not see half that went on, because some ladies in front of me had on such big hats.. Why do they not all wear little bonnets like you do, mother ? ”

“ That is simply a matter of taste ” said Mrs. Harris. “ Most young people like to wear hats, but we older folks like bonnets.

“ Have you ever thought how many

different materials are used in making head coverings? First, let us see the use of a hat or bonnet. In our country we wear hats to keep away the heat of the sun from the head in summer, and the brim shades the back of the neck and face. In winter we generally like to wear small, close-fitting hats, because no brim is wanted to shade us from the sun's rays; and the wind, being sometimes strong, makes it difficult to keep large hats on the head."

Ladies' hats are made in a variety of shapes, and as a boy once remarked, "If you only sat on a straw hat, and kicked it about the room, a girl would think it very pretty." However, that depends on the fashion.

A lady's hat is generally made of straw or felt, and in summer it may perhaps only be made of wire bent into shape, and covered with a fine net. Men's hats are made of silk, or felt, or straw.

Straw hats are made of plaited straw. Sometimes the straw is white, but it may be black, or dyed some other shade or colour.

Hats generally have a brim round them, which is sometimes narrow and sometimes

broad. The crown may be either high or low, and is made to fit on the crown of the head, or rather, it should be. Sometimes, however, the crowns of ladies' hats are so small that they have to be pinned on to the hair, which is coiled on the top of the head for that purpose. This putting of long pins through the hat once caused a bad-tempered old gentleman to say that ladies' heads were the only heads which were soft enough to pass a pin through without hurting them.

Men and boys generally wear straw hats in the summer, because they know that they will be much cooler than felt.

"At school you have, of course, read and heard about straw-plaiting," said Mrs. Harris to the children; "and you know where it is carried on."

"Yes," said Maud. "In Bedfordshire and round about, numbers of women and girls, and even little boys, earn their living by plaiting. The straws of wheat are cut into lengths and split, and the people either stay indoors or walk about plaiting these all day long. Luton is a town where much straw-plait is made."

"But, last week," said Bessie, "I saw a

new kind of straw hat in a shop window, which looked very light. It had *Panama* on the ticket. These are made of a grass which grows in America, and the hats are very light and comfortable."

"That is quite right," said Mrs. Harris, "we also have a very fine, light, but expensive straw called *Leghorn*. This is the name of a town in Italy, and in that country they make very fine straw hats very much like the Panama straw hats."

"Felt hats, I remember, were made from fur or wool," said Maud. "The wool is spread out in a thin layer, and after being moistened, it is beaten with rods until the fibres become matted together. But I cannot understand how the different shapes are made when the piece of felt is quite flat."

Mr. Harris had been in a workshop where felt hats were being made, so he was able to explain that the felt was stretched over a wooden block of the proper shape and size, and then made stiff with a kind of gum. Sometimes the edges of the brim were protected by being bound with a thin braid.

Gentlemen's straw hats are almost all of the same shape; but there is scarcely an end to the shapes of ladies' hats. Beaver fur was

once used to make men's hats, but it has been driven out of the market by silk. A shape of the hat is made of some stiff material like cardboard, and this is covered with fine silk, great care being taken to join the edges of the silk, so that the joins are not seen.

Caps have lately come into favour with men and boys, because they are light and comfortable. They usually have a peak in front and no brim. They are made of cloth of many varieties of colour and texture, and are lined very often with silk or satin.

Women's caps are for indoor wear. They are generally made of some light material, such as muslin, lace, or tulle, which can be bought in many pretty designs, and trimmed with ribbon. They are generally worn by elderly ladies.

Most servants wear a small white lace or muslin cap, which can be frequently and easily washed, ironed, and made up cheaply by themselves.

"For my part," said Mrs. Harris, "I prefer a bonnet to any other head-covering for women. It is comfortable, warm, close-fitting, and looks neat. It may be made of plaited straw, velvet, or silk, and trimmed with ribbon or lace or artificial flowers. In

trimming either hats or bonnets, care must be taken not to make them too heavy, otherwise headaches may arise from the extra weight and warmth."

"In many parts of Scotland," said Mr. Harris, "the man speaks of his hat as his bonnet, and very proud he is to call it by that name; for, in years gone by, when the Scotch dress was worn by all, the bonnet was a great part of the outfit. I daresay



you can remember the line of the Scotch song which says, 'Up with the bonnets of bonnie Dundee.'

For babies and young children bonnets are made to fit closely to the back of the head, and to cover the ears. They are often called *hoods*.

In very cold countries hats are made of fur, and are of such a shape that they entirely cover the head, with the exception of the eyes, the nose, and mouth. The

object of these hats is not to protect from the sun's rays, but to keep in the heat of body.

In hot countries the head is covered to protect it from the powerful rays of the sun, so the people wear as light a covering as possible. A long strip of muslin is twisted around the outside of the hat, and is allowed to hang down behind, so as to cover the neck and back of the head.

Those who do not wear a hat of this kind wear a turban. This is formed of a light kind of cloth like muslin, and is wound and twisted round and round the head to shade it and keep it cool.

## OUTDOOR GARMENTS

"Whilst we are out to-day," said Mrs. Harris, "I think I will buy Bessie a Mackintosh. She will find it very useful during the wet, wintry weather."

The two girls, Bessie and Maud, started out with Mrs. Harris to pay a visit to the largest draper's shop in the town; whilst Jack, well wrapped up in his overcoat, muffler, and gloves, went with his father to the park to see the skating.

How eagerly the two girls looked into the jacket department, and wanted to buy everything they saw. When they had finished looking through the window, Mrs. Harris proposed that they should go inside.

The shopman was very obliging and showed them all the kinds he had. There were cloaks of grey, cloaks of blue, cloaks of black, and cloaks of brown, all differing in style, and all waterproof. Some, however, of the newest were made of a material which was not only waterproof, but which allowed air to pass through from the outside to the in, and from the inside to the out.

Mrs. Harris thought that this kind of waterproof would be the best to buy, because it did not keep the body uncomfortably warm as many of the old waterproofs did, but she left it to Bessie to decide on the colour.

After a long time, which must have tried the patience of the shopman, Bessie chose a black one, as being perhaps most serviceable to her; and then Mrs. Harris asked to be shown some jackets.

"Really, mother," said Bessie, "there are so many that I shall not know which to choose."

"These long thick jackets which reach down to the bottom of your dress are very warm, especially when travelling," said Mrs. Harris; "but some people find them too heavy for walking. They are, I see, made of beaver cloth, diagonal, vicuna and other kinds of cloth; and they are rather dearer than most jackets, on account of the quantity of material they contain."

"I think I would rather have a short jacket," said Bessie; "they seem to me to be warm."

"Very well," said Mrs. Harris. "Show me some short jackets, if you please." So many different kinds were shown them that the counter was soon covered. Some were light and yet warm, while others were far heavier than Bessie wanted them. All were made of some woolly material, and many were trimmed with braid or fur to make them prettier and warmer.

The jackets of course were made in different styles. Some were cut high in the neck and some were cut low. Mrs. Harris naturally chose one which was cut well up, as she knew that to expose the neck and throat to the winter winds was a likely way of catching a cold in the chest.

After a time Bessie was fitted with the jacket she wanted. It was a really useful one, as well as one which made her look nice; for a garment which suits one person well may not look at all well on another.

Whilst Mrs. Harris and her daughters were in the shop, she had a look over the furs, so that she might be able to remind her husband of his promise to buy one for her.

After this they went into the other departments. There were not only waterproofs and jackets and furs, but there were shawls of every colour and pattern. Some were of wool, some of cashmere, and some of silk, whilst the Paisley shawls were a perfect picture in themselves.

Besides all these, there were boas and capes and muffs and rolls of cloth for winter dresses, in several parts of the shop, to say nothing of the gloves and stockings and wraps and flannels which the firm had got in with their winter stock.

As soon as the two girls and their mother got out into the street, they ran against Mr. Harris and Jack, who, having finished their walk in the park, were going to a tailor's a few doors off.

Jack had not worn out the overcoat which

had been bought for him the winter before ; but he had grown so tall and so big that it looked more like a coat for a baby than for him.

So Mrs. Harris went into the shop with her husband, whilst Bessie and Maud went home with the things which they had bought at the draper's.

In the tailor's shop there were almost as many coats as there had been jackets in the shop which Jack's mother had just left. Some were thick and some were thin ; some were lined and some were not ; some had capes and some had none ; some were light and some were dark ; but all were warm, and most of them were made of wool.

After giving the shopman a great deal of trouble, Mr. Harris chose for his son a long, loose coat, which had a cape to well cover the shoulders. " If we have a loose one and a long one it may perhaps last another winter ; but if we buy a shorter and a lighter fitting coat, it will be most likely too small before it is half-worn out," said he.

Besides the overcoat, Mr. Harris bought his son a blue serge suit, which was well lined and warm, and just the thing for the winter. Jack was not very strong in the

chest, and his parents had had a great deal of trouble with him until he was ten years of age.

"Never mind the look of the thing," said his father to the shopman. "No doubt an open vest looks better than one which buttons up close. I want him to keep warm whilst I have to look after him, and when he is grown up he can look after and please himself. Let me have comfort and health first, and fashion afterwards."

## MAKING AND CARE

"Have you ever thought what you would like to do when you leave school?" said Mrs. Harris to Maud, about a week after they had been shopping.

"You know, mother, I am very fond of needlework," said Maud, "and I think I should like to be a dressmaker."

"That means that you must be apprenticed for two or more years," said her mother.

"I know it will seem a long time," replied Maud; "but look how much I know towards it already. I can sew, hem, stitch, darn, sew on tapes, make button-holes, gather and put into a band, herring-bone and sew on buttons."

"Yes, most of those will be useful; you have done a little towards learning the business," said Mrs. Harris.

"I have also learned at school how to use my scissors," continued Maud; "and I cut out the bodice which I made for the inspector. I found it difficult at first to cut without jagging the edge of the material, but when Miss May showed me how to hold my scissors and to make long cuts, I got on very much better."

"How did you manage to get your pattern?" asked her mother.

"We first learned to draw a pattern on a sheet of square paper, on which every square represented one square inch," replied Maud. "When we knew the pattern thoroughly we cut one out in thin tissue paper; and, if it was well done, Miss May allowed us to use that to guide us in cutting the calico.

"We then cut off from a large roll the length of the garment we intended to make. Folding the paper pattern and also the calico to half the width, we pinned the pattern on the calico and then cut according to it. The bands, or any pieces which we wanted the selvedge way of the material, we obtained from that which was left, if the width of

the pattern were less than that of the calico."

"Cutting out dresses will of course differ from cutting out under-garments," said Mrs. Harris. "Lining will have to be cut for the bodice and skirt, as well as the material; and both must be made to fit the person for whom they are intended."

"Some of the elder girls in our school now learn dress-cutting by a new system which is called the scientific system," Maud replied. "All the measurements are made to scale, and the parts of the dress can be easily cut and afterwards fitted. I expect I shall learn the system next year."

"That will be a great help to you," said Maud's mother, "and I shall be glad for you to learn it." Most women are now able to make all their own under-clothing; and many, with the help of a paper pattern which can be bought, are able to make their own dresses. It certainly is an advantage to be able to do so, because if you have plenty of time, you can save the cost of making.

"When I went to school," said Mrs. Harris, "we were fortunate if we were taught to hem and sew."

"Well," said Maud, "I have made a gar-

ment at school every year. Once I made a pinafore and a pillow-case. This year I am to make a boy's flannelette shirt, and I shall learn to cut out a pattern of a yoked over-all.

"I think I understand the use of the binders, because I remember putting them round the opening of the sleeve of a night-dress; but why must we always make bands the way of the selvedge?"

"If," said her mother, "you take two pieces of calico and try to make a band each way of the material, you will quickly see that if one is made against the selvedge it will stretch very much."

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Just then Maud's father came in to tea; but in the evening, when he was gone out, Mrs. Harris again spoke to her daughter about her learning to be a dressmaker when she left school.

"No doubt," said her mother, "dressmakers will always find plenty to do, because most people can afford to have their dresses made for them instead of making them at home. But for all that I would advise every girl to try and learn to make her own dresses, or at any rate to help in the making. Jackets are

nearly always bought ready-made ; but some people prefer to buy their own material and have their jackets made for them by a mantle-maker. The ready-made ones do not often fit well, and very often they are badly worked.

"Men's clothes are generally made of thicker material than those of women. They are, as a rule, made to measure by some tailor ; but to hear the fault-finding which goes on when they are worn, one would think that no measure had been taken. Their shirts are generally bought by the half dozen, and are made by those who do nothing else. The sleeves, however, are always either too long or too short, and the buttons come off almost as soon as the shirts are worn.

"No girl knows what she may have to turn her hand to, and therefore I would have them all brought up to be useful with their scissors and needle. And if I had my way," went on Mrs. Harris, "they should be able to work a sewing-machine too. You can get over much more work with them ; and a handy woman in making and mending is far more likely to have a happy home than one who is not.

"But, after all, however much you may spend on clothes, much of it is wasted if you do not choose that which is most suitable, and

if you do not take care of them after you have got them. There are many things to be considered in choosing a dress, and the last ought to be fashion. This, however, is often the first point with some, who do not consider whether the material will suit them or their pockets.

“Buy nothing simply because it is cheap and because you may want it some time. Buy what you want and buy what you can afford, and, above all, buy only that which is suitable for the work you have to do, and the time of the year during which you wear it.

“I was just looking, Mary, to see whether you had on your apron or not,” went on Mrs. Harris. “I know you always think it a trouble to fetch it when it is upstairs and you want it down.”

“Yes, I know I do, mother,” said Mary ; “but I know it does keep the front of my dress clean and free from spots. I am going to try to get out the spots on this dress with some benzine if they are grease spots. If they will not come out, I am going to try ammonia.”

If you take care of your dresses they will last much longer than if you do not.

Always keep them free from dust, and never let mud spots stay on them any longer than is necessary. Wait only for the mud to dry, and then brush it off with a stiff brush. If the stains still remain, they should be sponged with warm water.



Washing dresses which have been used for summer, and are to be put away for the winter months, should be washed and left rough-dry; because if any starch remains in them it may weaken the fibres.

Woollen dresses should always be well shaken and brushed to free them from dust,

and then put carefully away. They should be looked at now and again to see that the moth has not got into them. Jackets should be served in much the same way, taking especial care with the fur trimming.

Boots should also be taken great care of,



and they should be kept in a dry but not in a hot place. Brushing and polishing protects the leather from the effects of damp weather, and keeps them from cracking. Nothing looks worse than to see dirty boots, or boots which have worn down on one side of the heel. Have them seen to at

once ; and should any buttons come off, save them, and sew them on as soon after as possible.

Never leave any of your clothes lying about the rooms, as in the picture on page 91. Chairs were not made for clothes. Have a place for them, and see that they are always there when they are not being worn. If this plan is followed, we shall not have girls coming late to school or to their work, because they could not find their hats or their jackets.

As soon as under-clothing gets worn, see that it is darned or neatly patched. Always remember the proverb, "A stitch in time saves nine." It may save ninety. Flannel patches must be put on the wrong side of the garment, and herring-boned. Calico patches are also put on the wrong side, but they are hemmed and sewn. Print patches are put on the right side, so that the pattern may be matched.

The time which under-clothing lasts depends to a great extent on the care which is taken in washing, and on the trouble which is taken in mending and patching.

Stockings and socks should be darned on the wrong side. If they are knitted, and the feet are much worn, new feet can be easily knitted in from the ankle.

## FASHIONS

"Mother," said Maud, "do let me have a lace collar—everybody has one now."

This was said some months ago, but Maud has not got her lace collar yet. In fact, she has quite forgotten all about it, and if you were to ask her if she would like a lace collar now, she would probably answer that they are not worn so much as they were.

"I cannot see why you want a lace collar when you have plenty of others," replied her mother. "I object altogether to running so much after the fashion. Every now and then people seem to want a change. Because some one else has a new thing they must also have the same, whether the things which they have are worn out or no.

"I believe in keeping a little within the fashion, but not in going to great extremes. I do not believe in dressing so as to make oneself look like an ancient Briton or a modern guy; neither do I believe in putting clothes on one side, because some one else has bought something new. Wear out the old, and then buy new."

"Many dangerous fashions have had their

day and are now forgotten," broke in Mr. Harris. "Perhaps the most dangerous was the old hooped-skirt, which to us, now, certainly



looks very ugly and uncomfortable. Yet at one time they were worn by the queen on the throne and the charwoman in the cottage.

"A few of these bad fashions still linger with us, and we yet, like the Chinese, try to deform our feet by squeezing them into boots which are far too small for them.

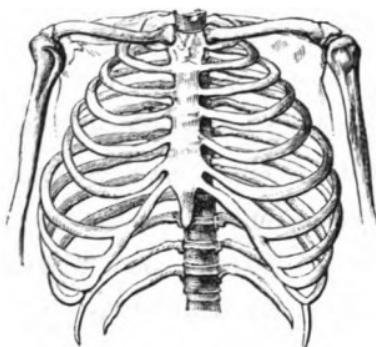
"Many ladies, in fact most of them, still squeeze themselves into corsets which are laced far too tightly. Our bodies contain our lungs, our hearts, our livers, our stomachs, and many other organs which cannot properly do their work if they are squeezed out of their place, or out of their proper shape.

"Still far too many women, and men too, think more of a narrow wasp-like waist, and of what other people may think of them, than they do of their comfort and their health. Of such people a Devonshire poet once wrote—

' I am sure that their waists  
Are squeezed up so small,  
It's a wonder the food  
Ever goes down at all.' "

"Yes," said Mrs. Harris to her husband, "that is all very well. Doctors may preach about people letting themselves grow naturally; but I have noticed that gardeners and fruit growers do not let their plants and trees and vines grow as they like."

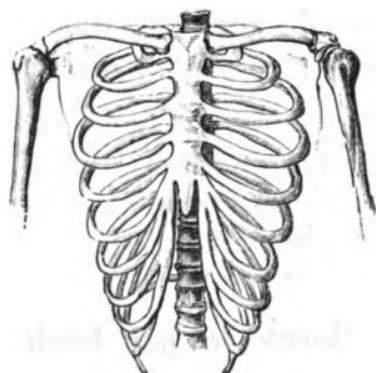
"Perhaps not," replied her husband, "but there can be no doubt that squeezing and



NATURAL.



NATURAL.



DEFORMED.



DEFORMED.

tight-lacing are very hurtful; and whether be corsets, or garters, or boots which are

too tight, they prevent the blood from flowing freely and from doing the good it should do.

"It was not long since that almost all ladies wore long dresses, which swept up the mud and the dust in the streets, and the poorer the person the longer and dirtier was the dress.

"This custom was extremely annoying to the men, who were continually being covered with dust, or always getting into trouble for treading on the dresses. Besides this, it seems to us now to have been a very dirty, foolish custom to buy cloth with which to sweep the streets, to say nothing of the extra weight on the hips."

"I do not think the fashions are as ugly now as they used to be," said Bessie. "I have been looking over some old pictures of bygone days, and the men and the women must have looked extremely funny then."

"Wait until you are as old as I am," said her mother, "and then, when you come to look at the tight sleeves of 1888, and the very large loose ones of 1896, you will see how ridiculous both of them look."

## WASHING

It was not long after Mr. and Mrs. Harris had been talking about the fashions, that great trouble fell upon the family. Mr. Harris was knocked down by a runaway horse, and his head fell so heavily on the pavement that he died a few hours after.

When the funeral was over the home was broken up, as Mrs. Harris could not afford to keep on the house and maintain the family. Bessie was already in service, Jack went to live with his uncle in Kent, and his mother and his two sisters, Maud and Mary, went to live with his grandmother near Bedford.

The family which came to live in the same house was named Hall. Mr. Hall was a printer. His wife was very homely and very kind ; and she had two daughters named Mary and Ruth, and one son named George.

They had come up from a country village in Surrey to live in London ; and it was not long before they found that they had far more to do to keep themselves and their house clean, than they had in the country.

On the first Saturday which they spent in

their new house, Mr. Hall said to his wife : “ This week I have made my shirts and collars twice as dirty as I did at Brand ; and I am sure I have washed my face and hands three times as often as I used to do.”

“ And so have I,” said Ruth, who was thirteen years old. “ My face and hands and my clothes seem to be always dirty.”

“ That is not surprising,” said her mother. “ Think of the number of houses and factories and engines which are constantly sending smoke into the air ; and of the many small pieces of dust caused by the wearing away of roads and boots, and clothes, and other things. The soot and dust are carried about by the slightest wind, and settle wherever they can find a resting-place.

“ No doubt we shall have more cleaning and washing ; but it must be done. Dirty houses are far more likely to make us ill than clean ones ; and, come what will, we must keep our skin clean, or we shall be, not only a trouble to ourselves, but to our friends as well.”

“ I know we must keep our skin clean,” said Ruth ; “ because fat and other things are always coming through it from inside. If these settle on the skin, dust settles on the

skin also ; and we should soon spread disease if we allowed the fat and dirt to remain on our bodies.”

“And it is the same thing with our clothes,” said Ruth’s mother. “Our clothes, both inside and out, become dirty, and, if we do not keep them as clean as our skin, we are likely to have sickness in the house.”

## MATERIALS FOR WASHING

[*For Manufactures, see Book III.*]

“Before you go to school this afternoon, Ruth,” said Mrs. Hall, “I want you to get me some starch, or I shall be quite out of it. I do not like to let my stores get very low, in case I might at any time want a little extra, as I do this week, for the white curtains which I am going to wash.”

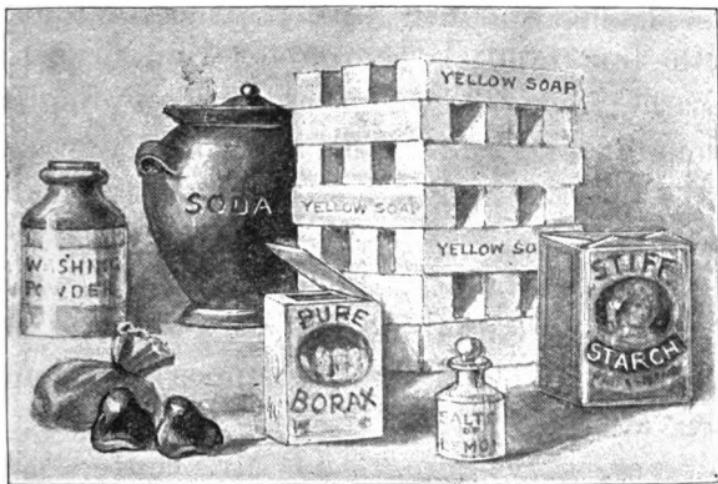
“Can I get anything else, mother ?” said Ruth. “I may save a journey if I get all now.”

“Let me see,” said Mrs. Hall ; “I have soap and soda and blue, but you might get me a little borax, for I think I have used nearly all I had.”

Ruth did as she was told, and Mrs. Hall

put the starch and borax away in a dry place as soon as Ruth brought them home.

In the evening Mrs. Hall began to get the things ready for the next day's wash, and she said to Ruth, "I like to have a good store of all I want for washing, yet they would be of very little use without plenty of water. I am very glad we have such a good supply here."



"The most important point to be considered in washing, is whether the water is hard or soft. Labour and cost both depend on the kind of water which is used."

"It sounds strange to call water hard," said Ruth; "what does it mean, mother?"

"Water, you know," said Mrs. Hall, "is a

liquid, and has the power of dissolving some substances. If you put a little salt or sugar into a glass of water, you lose sight of it, because the water has dissolved it. It can dissolve many things besides salt and sugar, and one of these substances makes soft water hard."

"A year ago," said Ruth's father, "I met a gentleman who had been out in Africa for two years, and who had just returned, bringing with him a black negro boy from near the River Congo. This boy could speak no English when he first came, but after being two or three months in England, he could say just a few words."

"How strange he must have felt," said George, "when he first landed, and could not speak a word of English. I suppose his friends were always with him."

"Yes, they were," said Mr. Hall; "and they tried to explain to him all that was new. One day some friends with whom he had been staying took him to one of our Parks to see some skating and sliding. After much persuasion he walked on to the ice, but immediately fell down. After trying for some time he got up, and, once off the ice, he could not be persuaded to go on again.

"Perhaps I ought to tell you now," said Mr. Hall, "that he had never seen either ice or snow before, because in his country it is always warm."

"How strange," said Mary. "I expect the boy thought it wonderful to see the liquid water turned into solid ice."

"Yes, he did," said Mr. Hall; "and his friends tried very hard to explain that ice was frozen water. At last he seemed to understand, and said, 'I see, hard water.'"

George said that he thought the boy was clever to be able to say that, for he must have understood what his friends had been explaining to him. "I cannot see," he said, "why we should call water hard and soft, when they both seem to be the same to the sight and touch."

"There is a difference between hard and soft water," said Mr. Hall. "If we caught the rain as it fell, the water would be soft. If we allowed the rain to soak through the earth, it might dissolve some substances which the earth contained, and which would make it hard. Chalk is one of these.

"If you were to wash your hands in rain water, and then in the water from the tap, you would notice that the soap lathered

better in the soft rain water than in the other."

"All housekeepers agree that soft water is best; and in Essex, where I used to live when I was a girl," said Mrs. Hall, "we always caught the rain in a large butt which stood in the garden, at the back of the house."

"If we collected the rain water of London, it would be dirty before we began to use it," said Ruth, "especially if it were kept in the butt very long, and frequent rains washed the soot from the roofs into it."

"Yes, that is true," said her mother; "so we have to find out some plan of making our hard water soft before we use it."

"I can tell you one way," said Mary. "I believe boiling does it; and will not soda also make hard water soft?"

"Yes," answered Mrs. Hall, "but too much must not be used."

"I have heard father say, that in some countries the people have to go perhaps a mile from their homes to get water, and have to carry it back to the houses in buckets," said Mary.

"That adds to the difficulties of a washing-day," continued Mrs. Hall; "and people who

do not care to walk a long distance to get their water, sometimes take their clothes down to the side of a river or stream and wash them there."

"When I was in Jersey, one of the Channel Islands," said Mr. Hall, "it was quite common to see women kneeling down by the side of a stream washing clothes,



and putting them into wooden tubs when they were finished."

"I hope they were near their homes," said Ruth, "because wet clothes are so heavy to carry. I think I would rather wash at home, as you then have everything at hand which you may happen to want."

Just then George, who had been to a cricket match in the park, came in, and Mary at once put the supper on the table. During supper, George and his father could talk of nothing but cricket; but after it was over, and the table had been cleared, Ruth wanted to know more about water and soap.

"No doubt," said her mother, "good soap is almost as important as good water, and if you can obtain both, you save both time and labour."

"I have heard," said Mary, "that if you buy your soap in large quantities, and keep it in a dry place, it will not lather away so quickly."

"Yes, that is right," said her mother. "When we lived in Brand, I always had to buy two or three bars of soap at a time, and if I happened to use a piece of the new soap instead of one of the dry, it was always used up quickly.

"Soda is another help in washing, but it must be used carefully. It is manufactured from the burnt ashes of sea-weed, and from common salt. Like soap, it is useful, because it softens water, and helps to loosen dirt and grease. When we wish to wash anything which is greasy, whether it be a greasy plate

or a greasy collar, we put soda into the water. Hot water will remove the grease or fat without soda, but cold water will not. Hot water melts grease and floats it away, but soda combines with grease, so that it breaks up into very fine particles, which float away in the water as froth."

If ammonia and water be rubbed on the greasy collar of a coat it does not wash away the grease, but the ammonia destroys it, and carries it off into the air. And in the same way, soda destroys grease if it be dissolved in water, so as to be able to get at it.

"Why must we use soda so carefully?" asked Ruth of her mother.

"In the first place," replied Mrs. Hall, "it destroys the dye in coloured articles. Also, if it should touch the clothes before it is dissolved, it is likely to partly destroy and weaken the threads of that particular spot, and to turn them yellow. Some people prefer to use borax, as it is less harmful than soda, and is more suitable for the washing of fine linen."

George remembered having read in a book about a quantity of borax being found in California, so he was able to tell them that it was found on the surface of the ground in a district where it never rained.

"It is also found in some countries of Asia," said Mr. Hall, "but it has to be prepared in the form of a powder before it can be used for washing purposes."

"Unlike soda," said Mrs. Hall, "it does not weaken the threads of the material, nor does it affect the dye. It answers the same purpose as soda by softening the water. Sometimes soda and borax are mixed with another substance called chloride of lime, and the mixture is called washing-powder."

"Most of the materials used for washing," said Mrs. Hall, "tend to give the clothes a yellow tint. To avoid this as far as possible we use indigo dye, which is known as blue."

"Blue may be used in two ways," went on Mrs. Hall. "Sometimes I use liquid blue, but I do not care much for the tint it gives the clothes. I much prefer the hand or stone blue, as it is called, because it gives a better tint; and if it be tied up in a piece of flannel, and then squeezed in the rinsing water, it does not leave any sediment on the clothes."

**WASHING UTENSILS**

If washing-day is to be one of comfort, or if clothes, when they are washed, are to be of a good colour, all washing utensils must be put away clean after being used ; and they must be again well cleaned when washing-day once more comes round.

On the one which followed the evening during which Mr. Hall and his wife had told their children so much about soap, soda, and borax, Mrs. Hall had to borrow a washing-tub from a

neighbour, and this is why she was compelled to do so.

When she had finished with her own, after the last wash, she had put the tub in a shady part of the yard and left it half full of water. A few days after, George had been told to clean up the yard, and thinking his mother had left the water in the tub by mistake, he poured it away and stood the tub where the sun could shine on and dry it.

There it remained for several days, and when George's mother went to bring it in on the morning of the wash, she found it not only dry, but cracked, and two of the iron hoops loose as well.

Mrs. Hall, although she was very sorry that she had not given an eye to the tub during the week, was not angry. She did not lose her temper and upset herself and every one else for the rest of the day; but she did tell George that he was in future to mind his own business, and not to interfere with things he knew nothing about.

Washing-day that week passed off very comfortably, in spite of George having, with the best of intentions, spoiled the tub. But on the Thursday evening, as Ruth was teasing her brother about being so useful on a wash-

ing-day, Mary said to her mother, "I should never have thought of keeping the tub wet, but I can see the reason for doing so now. Would it not be better to use tin baths instead?"

"They require quite as much care as tubs do," said Mrs. Hall, "for if a bath were not thoroughly dried, rust might form on the sides and bottom of it. It is far better to use a wooden washing-trough, of an oblong shape, with a ledge at one end for the soap; but more than one tub will be required, because some clothes would be in the rinsing water while others were being washed."

"I have just remembered that you told me to take the clothes-basket to be mended, mother," said Ruth. "Shall I take it this evening?"

"I think there will be time enough for Mr. White to put on a new handle before I want it, if you will remember to take it to-morrow and fetch it on Monday," said Mrs. Hall. "When I get the basket home again I must see that it is quite clean before I use it, for it would be a waste of time and labour to put clean clothes into a dirty basket."

"Speaking of the dirty basket reminds me that last week I began to hang the clothes on a dirty line," said Ruth.

"I hope you soon gave up doing that," said her mother. "Now I can account for the dirty mark on the table-cloth which I noticed when I was folding the clean linen things."

"Of course the moment I saw that the line was marking the clothes," replied Ruth, "I took them off again, and gave the line a good wipe with an old cloth. I wonder what makes the clothes-line get so dirty? It did not get so dirty when we lived in the country."

"There are many ways in which clothes-lines get dirty," said Mrs. Hall. "Some people let their lines remain out all the week, and of course dust and dirty rain are certain to soil them. Some people, however, take in the lines, but instead of carefully coiling them up and putting them away in a clean place, they either hang them up in a dusty place, or throw them down in a dusty corner. If you want to have clean clothes you must have clean lines; and if you wish your lines to be clean, you must keep them so."

"I remember once having trouble even with the copper-stick. When I was a girl we were told never to bother about it, as the boiling water would be sure to keep it clean. A cat, however, one day came into the kitchen after some fish which we happened to have there,

and my brother took up the copper-stick and threw it after the cat as it ran out into the garden. The stick struck against a tarred fence, and some of the tar, the next time the stick was used, got upon several of the things in the copper. So you see that you cannot be too careful over the cleanliness of everything used in a laundry."

Whilst Mrs. Hall and Ruth were talking, Mr. Hall came in from work. He took out of his pocket some papers, on which were some pictures of washing-machines, and handed them over to his wife.

As soon as Mrs. Hall had thoroughly looked at the first one, she said to her husband, "Did you think of buying one for me?"

"I am afraid we could not afford to do that," said Mr. Hall; "but perhaps we could get some kind of machine which would help you in some way, and not be so expensive. I looked at a good many to-day in a shop."

"I should like to have a wringer," said his wife, "for they save much labour and time, and they can also be used for mangling."

"We never saw such things as these in Brand," said Mary. "What a number of useful things we have bought since we came to London!"

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After tea Mrs. Hall and the two girls looked well over the advertisements, and found one which showed a picture of a wringer and mangle combined.

According to the reading at the bottom of the picture, the machine stood about four feet six inches high. The handle of the wheel which turned the rollers was just high enough for a woman to turn, and the rollers were made of hard wood, which would not splinter.

"How nice this would be for the flannels," said Mrs. Hall. "They could be squeezed much drier between the rollers than by hand."

"There does not seem to be much space between the rollers for thick garments," said Mary.

"The space between them can be regulated by the screw at the top," said Mr. Hall.  
"What is the price of that machine?"

"It is marked two pounds ten shillings," said Mrs. Hall, "and I really think it is worth the money."

"I hope we shall have one," said Mary. "I shall not mind turning the wheel, but perhaps George would like to do that." Strange to say, however, George, who was generally very sharp at hearing remarks passed on him, did not seem to hear this.

On looking through the papers which Mr. Hall had brought home, his wife and daughters saw many pictures of machines ; but as they had been brought up in the country, they were all strange to them. Mr. Hall explained to them how most of the machines worked, and it seemed that the different makers of the machines had all agreed to make them so that the clothes could be moved about in the water.

“The moving about of the clothes in the soapy water, which is placed in the tub at the bottom of the machine, helps to bring out the dirt,” said Mrs. Hall ; “and then the washer has only to rub lightly before boiling the clothes.”

In addition to the saving of labour there is a great saving of time, and that, in these busy times, is a great consideration. Some people do not seem to care much for machines, as they say that they sometimes tear the clothes. This, of course, may happen with careless people ; but with ordinary care there is no need for anything of the kind to happen.

“How delighted my mother would have been if she could have had the help of a machine like any of these,” said Mrs. Hall.

“I suppose grandmother had to do all her washing with her hands,” said Mary.

"She did at one time, but I can just remember her having a barrel and dolly to help her," said Mrs. Hall.

George seemed wide awake now, for he looked up quickly and asked, "What is a dolly?"



Mrs. Hall having seen the barrel and dolly in her own home, could readily tell the children about them, so she said, "The barrel stands upright, and into it the dirty clothes are put with some warm, soft, soapy water."

"The dolly consists of a stick about three feet long, something like a brush stick, and which has a cross piece at the top to form a handle. The bottom of the shaft fits into the centre of a flat, round piece of wood, from which five or six wooden pegs project," explained Mrs. Hall.

"I do not see how that can wash the clothes," said Ruth. "I should think that the pegs would rather tear them."

"It required much care when using it," said her mother. "The person using the dolly took hold of the handle, and lifted it up and down, and round and round, to move the soiled clothes about in the water."

"That is what the machines of these days try to do," said Mr. Hall, "but with a little less labour. The tub-like part of the machine which holds the clothes and the water turns round, and the water is forced through the clothes."

"I found the crinkled board a great help to me," said Mrs. Hall; "but the machine would be better still. One thing to which I much object, however, is the use of the brush."

"I have seen the boards and the brushes too," said Mary; "but how can the board help the washer-woman?"

"You have seen enough of washing," said her mother, "to know that, after you have washed one or two garments, your knuckles become sore from the constant rubbing."

"Yes, I do remember that," said Mary, "for when I first tried, I thought I should rub the skin off mine."

"The board simply takes the place of one of your hands, and upon the crinkled surface

of it, you can rub the soiled part of the garment rather harder than you could on your knuckles in the old-fashioned way," explained her mother, "but I must say that washing with a brush is a very bad plan."

"I think I can see the reason of that," said Mary. "Is it not because the coarse, hard fibres of the brush might tear the clothes?"

"Yes," said Mrs. Hall, "and fine materials especially suffer when a brush is used. No washing can be safer or better done than by rubbing the soiled parts together with the hands."

## **PREPARATION FOR WASHING**

Mrs. Hall had not been well since Friday, so Mary had done a good part of the house work. On Monday her mother was still feeling very unwell, so Ruth, having a holiday, stayed at home to help her sister. By this arrangement Mrs. Hall was able to rest a little, and thus was better able to help with the washing on Tuesday as usual.

"I always like to wash on Tuesday," said Mrs. Hall to her daughters, "as I then have Monday to prepare for the morrow."

"Why do you not send the washing out to be done?" asked Mr. Hall. "I am afraid you will not feel well enough to do it this week."

"I do not like to send it to the laundry more often than I can help, because the clothes may look yellow instead of white, and it is expensive too," answered Mrs. Hall. "I do like to see my clothes look nice and white, just as my mother's used to do in the country."

"Why should the clothes begin to look yellow, if they are not washed at home?" asked Mary.

"I can only account for it in this way," replied her mother. "The people who work at the laundry do not take sufficient interest in strangers' clothes to wash, boil, and rinse them thoroughly. They have a great deal of work to do, and must get it done very quickly, so that the linen may be sent home to the owners before the end of the week. If they have not sufficient time, of course they cannot get the clothes clean."

"Perhaps you fancy that," said Mr. Hall. "I do not see why the clothes should not be well washed at a laundry."

"I know that sometimes the dusters and towels must be very dirty, and consequently

very hard to get clean," said Mrs. Hall, "but I like to see even those small articles looking clean and white. I have at times found some garments torn when they have been returned from the laundry."

"Perhaps they used a brush to clean them," exclaimed Ruth. "I quite expect that some collars and cuffs have the linen face frayed out, and sometimes rubbed quite off, through the laundress scrubbing them."

"I think they must have done so," said her mother; "and I also think that they sometimes add to the water a little chloride of lime, which saves rubbing, but at the same time weakens and spoils the material."

"Our clothes always look white without those powders," said Mary.

"It is to my advantage to take great care in washing the clothes, because, by getting the dirt out by rubbing, and not by using harmful substances, they last much longer," said Mrs. Hall. "I think my clothes owe some of their white colour to the quick and clean drying which we could get in the country."

This conversation took place during breakfast, and directly after Mary and Ruth set to work to clean up the house. Since the family

had lived in London Ruth had attended a laundry class, which was held at her school, so she was able to help Mary a little without giving much trouble.

Sometimes Mrs. Hall had found that the help of Ruth and George was not of much use, as, for example, when George emptied the water out of the tub. So to prevent things going wrong, she directed the girls how to begin, and they were quite eager to do all they could.

"First of all," said their mother, "collect all the articles to be washed. There will be last week's underclothes, bed linen and house linen, and the handkerchiefs, collars, and cuffs. I intend washing my white curtains this week, too, so you may put them with the other things to be washed."

Ruth went to the kitchen and scullery and looked about for the dirty towels and dusters, whilst Mary went upstairs for the dirty linen, which was kept in the big linen-basket. She also found the white curtains, and brought them all downstairs.

"Perhaps I had better help you to look over the things to see if any require mending," said Mrs. Hall.

"Why do you mend the clothes now?"

asked Mary. "I should think it would be better to mend them after they are washed."

"That would never do, Mary," said her mother. "Suppose I had a hole in my apron, and put it into the wash like that. You know how very dirty aprons get," went on Mrs. Hall, "and how much hard rubbing they want before they become clean. Fancy my apron with a hole in it, and thin threads all round, being treated with hard rubbing."

"I can see what would be likely to happen," said Mary. "I expect the hole would become much larger, because the rubbing would break the thin threads."

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Both Mrs. Hall and Mary looked over the articles to be washed, and Mary was surprised at the amount of work there was to be done. Some garments wanted patching, and buttons were wanted on the wristbands of Mr. Hall's shirts.

"If you will put a small patch on this sheet," said Mrs. Hall, "I will mend the collars of George's shirts, which I see are fraying out."

"This sheet has not a hole in it," said Mary.  
"Why am I to patch it?"

"Because it is thin in the middle, and if it is not strengthened before it is washed, it will become torn," replied Mrs. Hall.

Ruth rather startled her mother and Mary, whilst they were busy at work, by saying—

"Do look at this stocking of George's ! How ever is it to be mended ? "

"That is a very big hole," said Mrs. Hall. "I am afraid I shall have to knit a new foot in that stocking. But you know stockings are mended after they are washed."

After the mending was done Ruth began to sort out the clothes, as she remembered having seen her mother do before ; and Mrs. Hall helped her by telling her exactly what to put into each heap.

"First, put into one heap all the muslins and fine things," said Mrs. Hall.

Ruth first thought of the white curtains, and then she added such things as laces, collars, cuffs, handkerchiefs and white fancy aprons.

Whilst Ruth was doing this, Mary had made a second heap of woollen clothes, which included the stockings, flannels, and all woollen under-clothing.

"That is right," said Mrs. Hall, as she afterwards saw Mary putting together all

the white body linen. "When you have done that, make a heap of the bed linen, while Ruth makes another for the house linen, such as table-cloths and serviettes."

Then Mrs. Hall collected all the coloured things, which had to be very carefully washed; and into the last heap she put all the very coarse things, such as rough aprons and towels and dusters.

When they had finished, Mary counted up the heaps, and found that there were seven.

"That is not quite as many as some people make," said her mother. "Some have one for stockings only, others for pocket handkerchiefs only, while some people make fewer bundles, and put the bed and body linen together."

Mrs. Hall now asked Mary to look over the house linen, to see if any of the table-cloths or towels were stained, for, if they were, the stains would have to be removed before the articles were washed.

"Here is a stain on this table-cloth, mother," said Mary. "I think it was caused by that black-currant tart we had."

"And here is an ink-stain on my pinafore," said Ruth.

"I am sorry these stains have been allowed to dry," said their mother. "They must be

treated differently, because the one caused by the ink is a mineral stain, whereas the other is a vegetable stain.

"Fruit stains should, if possible, be removed while they are fresh, for if they are left to get dry, a strong acid must be used to remove them. If I had noticed it at the time it was done," said Mrs. Hall, "I should have rubbed a little salt on it, and then have poured some boiling water over it."

"How shall we get rid of this stain now?" asked Mary. "It is quite dry."

"We cannot do better than wet it, and rub it with salts of lemon," her mother replied; "but the spot should afterwards be washed to prevent the salts from further hurting the material."

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"At the laundry class last Monday," said Ruth, "I saw Miss Adams take out a fruit stain, which was still wet, by soaking it in some boiling milk. It did not seem to give any trouble, and came out easily."

"Now, I will try and get the ink stain out of your new pinafore, Ruth," said Mrs. Hall. "It is not quite so easy to get out as the fruit stain. As the ink is dry, salts of lemon

is the best thing with which to bleach the spot. Get a cup and stretch the stained part over it, then wet the stain with water, and rub on it the salts of lemon till it disappears."

"I took out an ink stain once," said Mary, "with salt and lemon juice, and I saw Miss Wood, who was my teacher when we lived at Brand, take some ink stains out of one of our girl's pinafores by rubbing some white powder on the spot, and then stretching it over a cup of boiling water."

"The white powder was most likely salts of lemon," said her mother.

As soon as the fruit stain was taken out of the table-cloth, Mrs. Hall looked over it for tea or coffee stains, for there were generally some every week.

"These stains," said Mrs. Hall, "should be treated differently from others. Soap must not be used for them, as it only helps to fix them. The best plan is to soak them in cold water, and then to stretch the stained part over a basin and pour boiling water over it in which you have dissolved a few spoonfuls of borax."

"How would you get out animal stains, such as grease?" asked Mary.

"They are not difficult to remove," replied

her mother, "if the stain is on a washing material, for it will easily wash out ; but if the material is not washable, then put on a little powdered chalk, and place it under a piece of brown paper and a warm iron. This will melt the grease, and the chalk and paper will absorb it. All you have to do then is to rub with a dry cloth. Benzine for valuable things, and benzoline for common things, are also very useful, but they may not be used near a fire or light.

"And while we are speaking of cloth and grease," continued Mrs. Hall, "I think you should know that paint can be easily removed if you rub it with flannel and turpentine, whilst tar can be as easily removed by benzoline and paraffin."

"I think we have well looked over the clothes," said Mrs. Hall, "and all we shall have to do now will be to get ready to soak those garments which will stand soaking."

"Is there anything, then, that we must not soak ?" asked Mary.

"Yes," said her mother ; "flannels and coloured things should not be soaked, or the flannels will shrink and the colour will come out of the prints. Some people do not soak their things at all ; but I think it is quite

necessary, for next day's work is really begun for you if the things are put in soak over night."

To do this part of the work well, you want soft, soapy, tepid water. The water must not be hot, because hot water often fixes that which you wish to get out. The soiled parts must be rubbed well with soap, and if a little borax is added to the water, in which the fine things are soaked, it will greatly help. For the coarser and more dirty things soda can be used instead of borax.

"As I like to begin early in the morning," said Mrs. Hall, "you must lay the fire and fill the copper this evening. Be sure you do not forget to fill it, Mary. I remember that I once forgot to do so, and had just lit the fire under the empty copper before I thought of the water."

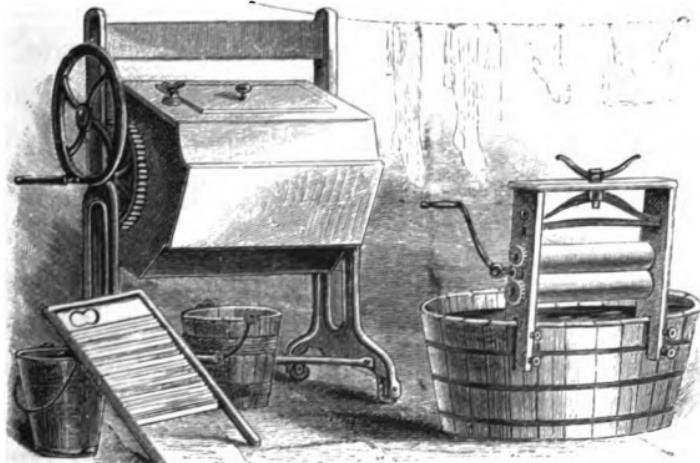
"Shall I get the tubs ready, mother?" asked Ruth. "I think that one in the shed will want emptying."

"It will," said Mrs. Hall. "The water which has been left in the tub to prevent the wood shrinking must be thrown away, and some clean water put in to rinse it out."

After all the preparations for washing-day made, Mrs. Hall and the two girls sat

down to do a little needlework. Ruth was crocheting some lace with which to trim a new night-dress which her mother was making, and Mary was knitting a foot into a woollen sock belonging to her father.

"I think we have everything ready now," said Mrs. Hall. "I feel better than I did this



morning, so I think I shall be quite able to do my work to-morrow. I only hope it will be fine."

A very sharp double knock at the front door then startled the family, and George and his sisters immediately began to wonder what the postman had brought. Ruth opened the door, and was surprised to see a van outside.

Mr. Hall had followed Ruth to the door, for he had an idea what the double knock meant.

After a little trouble a wringer was carried from the van into the house. Then the excitement became very great, for everybody wanted to examine the machine and work it.

"How fortunate that the machine has come to-day," said Mrs. Hall, who was very well pleased that her husband had really bought one. "It will help us so much to-morrow."

## THE WASHING-DAY

Early next morning, as soon as she came downstairs, Mary lit the copper fire, so that during breakfast the water would be getting warm.

"I know that these clothes have to come out of the soaking water," said Ruth; "so I will try and get them out before mother comes downstairs."

As soon as Ruth said this, she began to wonder if she ought to wring the water out of the clothes, or just lift them out into another tub. To make sure that she was doing what was right, she questioned Mary about it.

"The linen should be slightly rubbed and

the water squeezed out," said Mary. "The dirt will be loose, and a very little rubbing will take some out."

"Oh! do look at the water in which these clothes have been soaked," said Ruth soon after. "It really must have taken out some of the dirt by itself."

Mary and Ruth had got all the clothes out of the soaking water and the tubs ready by the time their mother came downstairs to breakfast. They all had to wait a few minutes for George, because, as soon as he came down, he again went to look at the wringer.

Breakfast was soon over, the table was cleared, and George had gone to school. Ruth was anxious to begin at once, but Mrs. Hall first made arrangements for dinner, so that she could go on with her work without interruption when she had once begun.

Mrs. Hall did not like her husband and family to feel that their comfort was neglected on washing-day, and she was always careful to see to the meals.

"Now I think we will begin to wash," said Mrs. Hall, after all preparations for dinner were made. "I always like to begin by washing the flannels, because the water need only be moderately warm, and I like to get

them dry early in the day. They will dry quicker than usual to-day, because I can pass them through the wringer."

"I think the wringer wants dusting," said Mary. "I will dust the rollers if you will turn the handle, Ruth."



"Whilst I am filling these two tubs with warm water from the copper," said Mrs. Hall, "one of you could separate the coloured from the white flannels, while the other one makes me a lather to put into the tubs."

Mary made a lather by cutting up into

small pieces about half a pound of soap and dissolving it in some hot water. This her mother added to the tubs of warm water, while her daughter filled the copper again to be ready for the washing of the white things.

"Why do you separate the coloured from the white flannels?" asked Ruth.

"I must wash the white flannels alone first," said her mother, "because the colour may run a little from the others and spoil the water."

The white flannels were now put into the first tub, and were washed by being moved up and down in the water.

"Why do you not rub the flannels?" asked Ruth of her mother.

"Because it causes them to thicken," she replied. "I find I must rub George's stockings sometimes, for they get very dirty."

"Before I put these flannels into your tub, Mary," said Mrs. Hall, "I want you to dissolve a little ammonia in some water; it will prevent the flannels shrinking. If you put it in at once it will have time to melt while I wash the flannels in this tub."

Mrs. Hall washed the flannels by moving them up and down in the water and pressing them. They were then put into the other

tub, and Mary treated them exactly as her mother had done at first. Then they were rinsed in warm water by lifting them up and down until they felt soft to the touch. Sometimes Mrs. Hall found it necessary to rinse them twice.

"Squeeze out as much water as you can from the flannels," said she, "before passing them through the rollers."

"Why may I not wring them?" asked Mary. "I can get more water out that way."

"Flannels want very careful washing and drying," said Mrs. Hall. "Wool readily shrinks if it is put into either hot or cold water. Wringing has the same effect, and if woollen clothes shrink and become thick and hard they are uncomfortable to wear."

The coloured flannels were washed in much the same way, but a little salt was put into the rinsing water to prevent the colour coming out.

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While Mrs. Hall and Ruth passed the flannels through the wringer, Mary washed the stockings and socks, first on the right side, and then on the wrong side. Ruth was

busy turning the handle of the wringer, when something cracked loudly.

"What was that?" said Mary, looking round at the others.

"It is one of the pearl buttons on George's flannel shirt," said Mrs. Hall; "but I see I must be careful in future to fold all buttons inside, so that they do not come under such hard pressure, for if they break, they might cut the flannel."

As the flannels came from between the rollers, Mrs. Hall opened and shook them, and dropped them into the basket into which Mary had put the stockings, ready to be hung on the line.

Before hanging the flannels on the line, Mrs. Hall told Ruth to wipe it well with a clean cloth, so that the garments should not be marked by it.

"You might peg the stockings to the line by the toe," said her mother, "and I will hang up the larger garments."

The petticoats were hung and pegged by the band, so that the water could run down from the thick, pleated part. The shirts were fastened to the line by one side of the bottom, because that would allow the wind to blow open the garment, and dry it quickly.

Mrs. Hall was then ready to wash the white things which had been rubbed and wrung out of the soaking water. The tubs had already been refilled with clean hot water, which was taken from the copper, and to which had been added a very little soda and a good lather of soap.



“ Will you put your hand into this water,” said Mary to her mother, “ to see if it is hot enough ? ”

Mrs. Hall, on doing so, found that it was too hot. She explained to the girl that if the water were too hot, it would be likely to

fix the dirt in the clothes, and might prevent the washer cleaning them properly, because it might hurt her hands.

"While you are filling the copper again, Ruth," said her mother, "Mary might help me to wash some of these fine things. Give particular attention to the edges of the collars and cuffs, for they get very soiled. The best way to wash them is to turn down the edges, and then rub together the double parts."

"Oh, dear!" said Mary, after she had rubbed a little while, "my knuckles feel quite sore."

"Perhaps that is because you are rubbing the linen against your fingers, instead of rubbing one part against another," said her mother.

Mary watched her mother for a minute or two, and then began again. "Now I am going to try and wash as you do," said she, as she rubbed the cloth instead of her hands.

"The work we are doing now," said Mrs. Hall, "is called *firsting*. It is really giving the clothes a good wash on the right side.

"Begin by soaping the very soiled parts, such as round the neck-band and the cuffs. Then rub the linen one part against another on the right side only. When you have done that, rub the garments on the wrong side,

and put them into the other tub of warm, soapy water ready for *seconding*."

Mrs. Hall washed the laces and muslins herself, because they were likely to tear if they were not handled carefully. "The white curtains I shall move up and down in warm water, to take out the dirt which was loosened in the soaking," said Mrs. Hall. "Then they will require to be well rinsed and blued, and pinned on to a sheet to dry, to help them to keep their lacy appearance.

"Some people do not second their clothes," said Ruth's mother, "and I think that will account for the yellow look of some pillow-cases and sheets. I like to second even my coarse towels and dusters."

Ruth had now got the copper ready for the white things which had already been washed. Her mother was quite pleased to see how nicely she had made a lather of soap and soda and boiling water, and added it to the copper.

She then put the white things one by one into the water. The laces and fine things she first put into a linen bag, so that no scum should settle on them, and so that it would be quite easy to take them out when they had been properly boiled.

"While they are boiling for fifteen or twenty

minutes," said Mrs. Hall, "we can begin washing the coarser things. Some of them are very dirty, and they will require well rubbing both by hand and on the board. Before we begin, add some washing-powder, or some soda, to some hot water, and pour it into this tub. That will help to loosen the dirt a little."

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Both Mary and Ruth washed the coarse things, while their mother looked after the clothes which were in the copper. The water boiled so quickly, that the clothes had to be pushed down into the water lest they should get any scum on them.

"Why do you not open your copper door for a minute?" said Mr. Hall, who had just come in. "You get nothing by making the water boil fast. Water which is boiling slowly is as hot as water which is boiling fast; the extra heat only boils the water away as steam. People very often use a great deal more coal and gas than they need do."

"And how long have you been a laundress, my dear?" replied his wife; but, as Mr. Hall did not take any notice, Mrs. Hall merely said to Mary, "I think these white things have boiled long enough now. I will take them

out of the copper and put them into a tub of clean, cold water to be rinsed."

"How are you going to take the clothes out of the boiling water?" asked Ruth.

"How? why, I shall lift them out with the copper-stick, of course," said Mrs. Hall. "The lace which I put into the bag I will now take out, because I want to rinse the soapy water out of them."

"The copper is clear now," said Mary; "may I put these coarse things in?"

"Yes," said her mother. "Are they very dirty this week? because, if so, I shall add about a tablespoonful of paraffin to the water in the copper."

Mrs. Hall looked at the coarse things, and found that the two girls had washed them so nicely, that they would require no paraffin that week.

Mary put the things in the copper, and Ruth watched her mother.

"Why did you not put the clothes into the bluing water?" asked Ruth. "That would save time."

"It is very important," said Mrs. Hall, "that the soap should be thoroughly rinsed out of the clothes, for if it be not, they may turn a little yellow. I know that some people

do not rinse them before blueing them, but I think it is very necessary.

"The coarse things may be left to boil for about half-an-hour," went on Mrs. Hall. "Meanwhile, we must rinse and blue and hang out these white things, and then wash the coloured things."

"Why do you blue the clothes?" asked Ruth, as she watched her mother take up a little of the blue water in the palm of her hand to test the colour.

"As I told you once before, blueing improves the colour of the clothes," replied Mrs. Hall. "When they are in the copper, the soda and the soap tend to make the linen yellow, and the blueing prevents this."

"But clothes should never be allowed to stand in the blueing water, because the blue is likely to settle on the garments in patches."

After wringing the things out of the blue water, they were passed through the rollers of the machine. Mrs. Hall was careful this time to fold the buttons inside, and to fold the garment so that no part was strained. Then they were shaken and dropped into the basket, and taken outside to be hung on the line.

Mary was washing the coloured things while  
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the wringing was going on. They require great care, for, if the colour be allowed to run, they soon look faded and shabby. The water must not be too hot, or it will draw out the colour, and they must be washed quickly in both waters.

Mary did not quite know how to rinse these things, so she asked her mother, who did. "Get some clear, cold water in one of your tubs," said she, "and to it add a little salt or alum in order to fix the colour. Rinse the clothes in this, pass them through the wringer, and bring them out to be hung on the line."

Mary did her best to follow her mother's directions, and by the time she had finished, the coarse things in the copper were ready to come out to be rinsed.

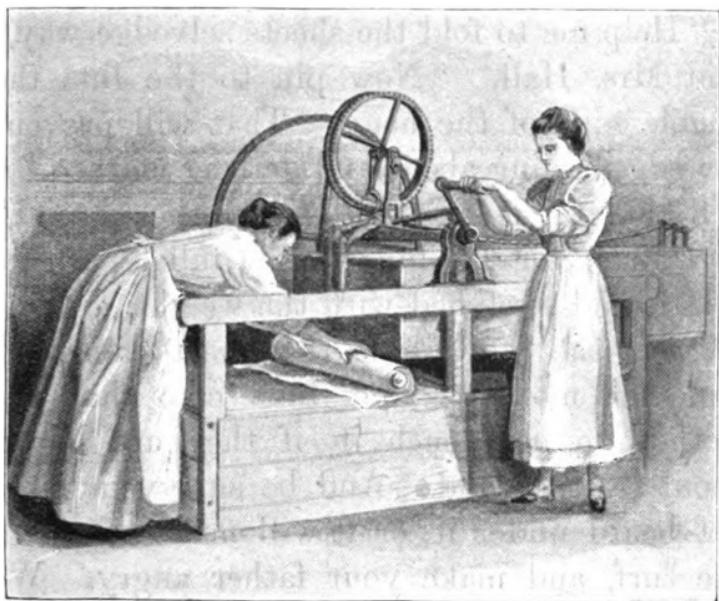
### **DRYING, FOLDING, AND MANGLING**

"I am glad it is keeping fine," said Mrs. Hall, as she took the basket of white things into the garden. "See if the flannels are dry, Ruth."

"I think they are quite ready to be taken

down, mother," said Ruth ; " this wind is just right for drying clothes."

The white things were then taken out of the basket, and hung up on the wrong side, just as they were left after having been rinsed.



"Why do you hang them on the wrong side ?" asked Ruth.

"It keeps the blacks and specks of dust from the right side. London air is so full of smoke and dust that the clothes are likely to get spotted," replied her mother. "Hang up the body linen much the same as you did

the flannels. Peg the thickest part of the garments to the line, so that the water may run out. Do not pin the double edges of night-dresses and shirts together, and be sure to place them so that they may catch the wind."

"How shall we hang these large sheets and table-cloths?" asked Ruth.

"Help me to fold the sheets selvedge way," said Mrs. Hall. "Now pin to the line the double edge of the hems. That will prevent the edges flying about and getting marked."

"This table-cloth will touch the ground," said Ruth, for the line was so full of clothes that it had stretched with the weight.

"Put the prop under the line to raise it," said her mother, "but take care that the clothes do not touch it, if they are blown about by the wind. And be sure you put a flat board under it, or it will make a hole in the turf, and make your father angry. We must take care where we hang the coloured things, for, if they are hung in the sun, they may fade. At the same time, I want them to dry quickly, so I shall put them where they can catch the breeze."

The coarse things were by that time ready to be hung out to dry, and Mary did this whilst Ruth and her mother cleaned the tubs,

dried the zinc bath, emptied and dried the copper, and washed and dried the copper lid. After that, they cleared up the wash-house and put everything in its place.

When George came home from school he was anxious to know if he could turn the handle of the wringing-machine; but the wringing had already been done and the machine put away for the day.

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As Mrs. Hall expected, the clothes were dry by the middle of the afternoon, and they were taken down from the line and put into the basket. Mary took down some of the smaller things; but as she did so, she dropped the pegs on the ground. Her mother, however, soon saw what she was doing, and advised her to save herself future trouble, by putting them into the bag as she took them from the line.

"Take in this basketful of clothes," said Mrs. Hall to Ruth, "and I will come in and show you how to fold them. Before we begin, wash your hands and put on a clean apron."

"I see that some of the smaller things are quite dry," said Mrs. Hall. "I shall want a basin of clean cold water ready at hand, so that I may sprinkle the garments, and make

them rather damp for mangling and ironing. You may begin by turning the garments on to the right side, Ruth."

"They have dried nicely," said Mary. "What would you have done if it had been raining, for the clothes could not then have been put outside?"

"I should have had to make the best of it, and to have dried them indoors," said Mrs. Hall. "I do not care to do this, because the clothes do not dry so well, and it also makes the air of the house damp. They dry fairly well, though, if the room can be well ventilated."

In the meantime Ruth had folded a pillow-case which did not need sprinkling, but Mrs. Hall told her that it was folded wrongly.

"In folding clothes," said she, "always put the edges together and make the selvedges meet. If the articles are out of shape, then gently pull them into the proper shape. Next fold them up tightly and press them closely together for some time, so that they may all be equally damp."

"This is too large for me to fold," said Mary, as she held up a sheet. "What shall I do with it?"

"I will help you to fold all the large things, such as sheets and table-cloths," answered her

mother. "They always require two persons to fold them. You should always fold the sheet exactly double, and put the wrong side outside."

"The edges will not come straight at this end," said Mary; "so I suppose I must pull them till the corners meet exactly."

"That is right now," said Mrs. Hall. "Turn the bottom fold up to the top edges; and we must be careful that the second fold is not creased more than we can help."

Sheets and table-cloths should be folded in four, and serviettes in three. Those garments which are to be mangled must have the buttons protected inside the folds, or they may break and cut the stuff. House linen, towels, and such things are to be mangled; but collars, dresses, and fine things are to be starched and ironed. Some people like to have their body linen and table linen mangled before being ironed, because the articles are made smoother and more glossy, and thus keep clean longer.

Mangling is subjecting the clothes to pressure between two heavy wooden rollers. The clothes must be well and carefully folded, so that they do not get twisted or strained. Heavy, coarse articles should not be mangled with small ones. Good mangling saves labour in ironing.

**STARCHING**

"As we began so early and got on so well," said Mrs. Hall, "we shall be able to get the starching done to-day. Some people begin to wash so late in the day, that they have to leave the starching till the morrow. I put the things which are to be starched in a heap by themselves, as I folded them, so they are quite ready now. Get me the starch and a large clean basin, and I will show you how to prepare starch."

Mary quickly brought the things, and while her mother was getting ready to begin the starching, Ruth said, "Mother, what is starch? I am sure I do not know."

"Well, then, you ought to know," said her mother. "Surely you had a lesson on and read about starch last year in school."

"No, mother, we did not; they are taking domestic economy this year for the first time," said Ruth.

"That is a pity," replied Mrs. Hall. "You had better ask your teacher to be kind enough to lend you the book they use in the class below yours, and there you will read a great deal about starch."

"It is obtained from vegetables, and that used for washing purposes is generally obtained from the rice plant. Wheat starch was once very much used, but it was too stiff for fine things, and used to settle in patches on some of the linen. Flour is something like starch. If it be wetted it makes a sticky paste, just as starch would do if it were slightly wetted."

"I can see why we starch collars and cuffs," said Mary; "but why do you put a little starch in the table linen?"

"In the first place, a little starch in the table linen improves its appearance, and helps

the linen to keep clean longer than it otherwise would," said her mother. "In the second place, fruit or grease stains cannot so easily soak into the fibres when they are protected by starch.

"I shall have to prepare two basins of starch," continued Mrs. Hall, "because the cuffs, and collars, and fronts, and wrist-bands of shirts are better done in starch prepared with cold water. For my laces and muslins boiled starch is best. Perhaps you can make one while I make the other."

Mrs. Hall put into a basin about two tablespoonfuls of the best starch, and then told Mary to gradually mix it with about half-a-pint of cold water, stirring well all the time. "When it is smooth," said her mother, "add to it half a tea-spoonful of borax, after you have dissolved it in a little boiling water; and also add a quarter of a teaspoonful of turpentine."

While Mary was doing this Mrs. Hall prepared the boiling-water starch. Into a basin she put one tablespoonful of starch, as only a little was wanted; and she added to it sufficient cold water to make it about as thick as cream. After this she put into it half a tea-spoonful of borax, and a piece of wax about

half an inch thick. Over this Mrs. Hall then poured boiling water, and stirred with a wooden spoon, until the starch was semi-transparent.

"I must put this aside for a while until it gets cool enough for me to use," said their mother, "and in the meantime I will go on starching with the cold-water starch."

"Why did you use borax and wax and turpentine?" asked Ruth, who had been watching what her mother had done.

"Borax," said her mother, "helps to whiten and stiffen the linen; and the wax is used to prevent the starch from sticking to the iron. Some people, however, use sugar instead of wax. The turpentine gives the linen a gloss, and men like to see their collars and cuffs and the fronts of their shirts with a good gloss on them."

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"The cold-water starch has been standing some time," said Mrs. Hall, "so I must stir it before I use it. The starch does not dissolve in cold water, and as a result it settles at the bottom."

"Can I starch the collars and cuffs?" said Mary.

"Yes, if you will take care not to let the starch settle on them," said her mother.

"Rinse the articles and rub them as you do when washing them. Do not try to do more than two or three collars at a time, as it is important that starch should be well rubbed in. Then squeeze out the starch, and place the collars and other small things which you have done in a clean cloth, fold it up tightly, and wring as dry as possible."

"Are the collars ready for ironing, now I have starched them?" said Mary.

"No," replied Mrs. Hall, "they must be put away for a little while to partly dry, because, if they are too damp, they are likely to stick to the iron."

"How will you starch this shirt, mother?" said Ruth. "It does not require starching all over."

"First gather the front of the shirt in the left hand like this," replied her mother; "dip it into the starch, and, at the same time, rub the starch well in with the right."

"I should think that that part of the shirt near the front would get starched too," said Mary, who had joined Ruth in watching their mother.

"I hold it as tightly as I can," said Mrs. Hall, "but still a little starch may get on to the body of the shirt. Now I will squeeze the

extra starch out of the front, and dip the collar and cuffs in the same way.

"While I fold the starched parts of the shirt together, and damp the other parts ready for folding tightly, you may go on with anything else which requires cold-water starching," said Mrs. Hall. "If you add more cold water and mix it well, you can starch the table linen, because that does not require to be made very stiff."

The starch was not rubbed into the table-cloths as it was into the collars; but they were simply dipped in, and then the starch was squeezed out again.

Mrs. Hall then, with her hand, tried the boiled starch, and found that it was just about cool enough to use.

"I do not think I will starch my white curtains," said Mrs. Hall, "for they have dried beautifully, and they look quite nice. If I starch them, they must be ironed, and the threads are likely to get broken."

"I do not like the look of starched curtains," said Mary. "They look so very stiff, and they do not hang nicely."

"You may starch the laces and muslin aprons," said her mother, "although I think they are better without being starched, and

I should not do it if I were still living at Brand."

"The starch seems to hang in the holes of the lace, mother," said Mary; "what shall I do to get it out?"

"The lace only requires to be well shaken and clapped between the hands," said Mrs. Hall. "Some people knock the lace on to a clean cloth, and that gets the starch out. And now that you have finished starching, you may put the basins away.

"But I see you have not quite finished, for you have forgotten to fold up the lace in a clean cloth, ready for ironing to-morrow."

## **IRONING AND GOFFERING**

The next morning looked very dull, and Mrs. Hall said she was glad that her clothes were washed and dried.

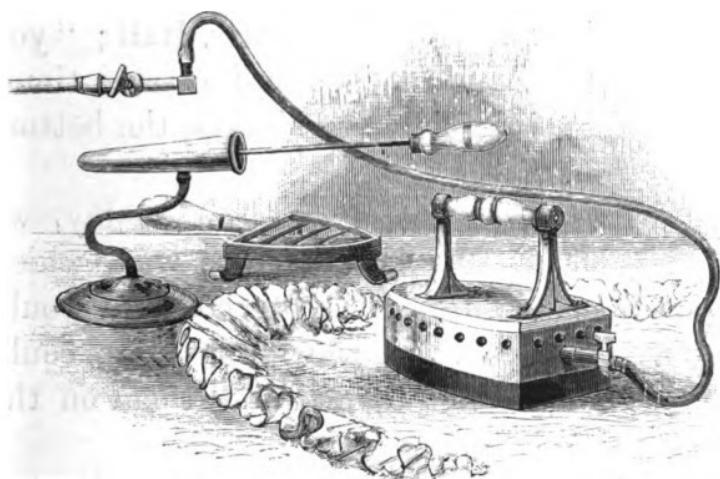
Mr. Hall, after he had had his breakfast, asked his wife how the new machine had worked, and whether it had helped them as much as she expected it would do.

The girls were so eager to praise the wringer, that Mrs. Hall allowed them to tell ther that it had saved much time and

labour, and that the only mishap was the breaking of a pearl button or two.

Mr. Hall was glad to see Mary and Ruth taking such an interest in household work, and he promised to buy them something else a little later on.

"I will tell you what I should like," said Ruth. "I saw a gas-iron at the laundry



class last week. I did not see any one using it, but I asked one of the girls how it was worked, and she told me. One end of an indiarubber tube is placed over a gas-burner, and the other end is fixed to a hollow iron. The gas is turned on and lit in the iron, causing a flame which makes it hot."

"I do not think that would be of much

use," said Ruth's mother. "After a time the iron would get so hot that it would scorch the linen."

"Oh!" said Ruth, "I forgot to mention that the pointed end of the iron has an opening, and that through it heated air passes out. So the iron, when once thoroughly hot, keeps at the same temperature."

"There are, I can see, some advantages in using an iron like that," said Mrs. Hall; "you can keep it clean and hot at the same time: an open fire is so liable to blacken the bottom of the iron.

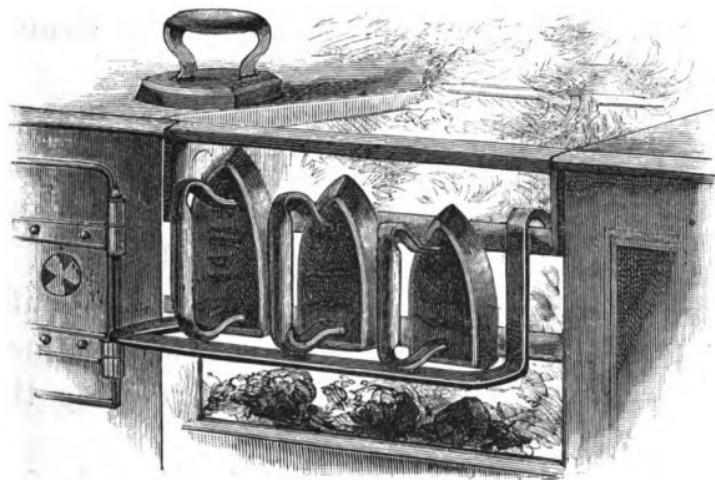
"As we have not a gas-iron to-day, we must make up a good clear fire with which to heat our own irons. If our landlord would put a closed stove in the kitchen, we could make the irons hot by standing them on the top of it.

"Make up a good fire, Mary, by clearing out the bars, and putting small pieces of coal at the back. As the fire sinks in front, bring the hot coal forward, and replace it at the back with fresh coal.

"Before placing the irons in front of the fire, they must be cleaned with emery paper and brick dust. Even after they are hot, it may be necessary to rub them again on powdered

brick dust. This must be rubbed off with a duster, and the irons passed over a paper greased with white wax, then after being again rubbed with a duster, they will be ready for use."

Whilst Mrs. Hall had been talking to Mary, Ruth had gone to school, so they had to do the ironing alone. First they prepared the



ironing-table by covering it with a piece of felt and an old blanket, and by stretching over and securely fastening to it some clean sheeting.

Mary then placed the iron-holder and the iron-stand on the right of the table, together with a basin of cold water, and a clean piece of muslin.

"Shirts are most difficult things to iron," said Mrs. Hall to her daughters, "and as they require a very hot iron for the starched parts, I will do them first. The whole of the shirt must be ironed on the right side," went on Mrs. Hall, as she began to get the first shirt ready to iron. "I always iron first that part of the shirt which will be the least likely to crease, so I will begin at the back, then go on to the sleeves and the wristbands.

"The wristbands must be ironed lightly on the wrong side, and then firmly on the right side. Press heavily on the edges, and iron until the cuffs feel stiff. Then, as I have a polisher, I shall damp the cuffs slightly with a clean piece of wet flannel, and pass the polisher over them, curling the cuffs as I finish.

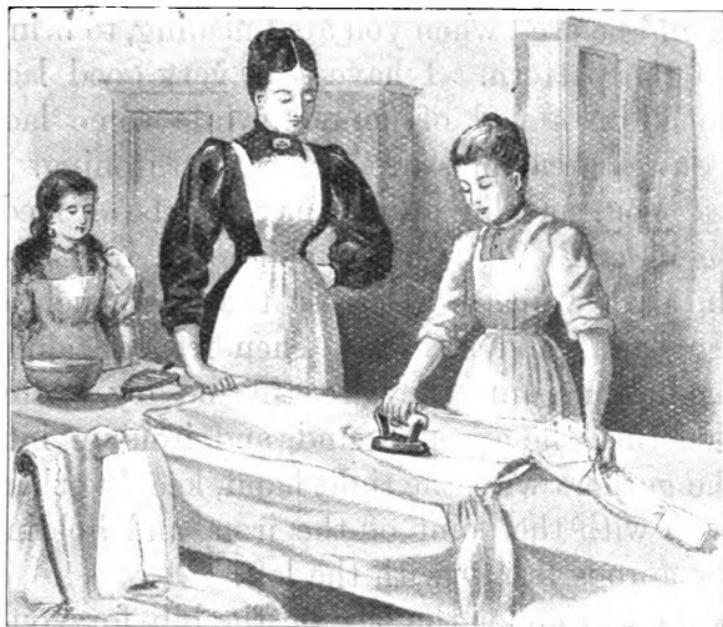
"Now I will iron the neck-band, and after that the unstarched parts of the front of the shirt, leaving the front till the last, because that requires great care."

"I can see a speck of black on the shirt-front," said Mary. "Here is the wet muslin with which you can take it off."

"I never like to see a dirty shirt-front," said Mrs. Hall; "it looks so untidy and care-

less. Some people do not care to iron their shirts at home, because they want so much attention, and both men and tidy boys, as I have already said, like to have glossy fronts to their shirts."

To make a shirt-front look nice, a hot iron



should be passed over it on the right side, until it becomes smooth and glossy and stiff. A shirt-board, covered with flannel, which can be placed inside and under the front, will greatly help in this.

Mrs. Hall then folded up the shirt with the

front outside, and put it on the clothes-horse to air, whilst Mary went on with the collars and cuffs, which she did very nicely.

"I should like to iron the lace," said Mary.  
"I have never ironed any yet."

"You must iron lace on the wrong side," said her mother, "and the point of the iron should be used when you are finishing, to bring out the pattern. I have seen very good lace ironed on a pad of flannel, while some lace requires great pressure rather than ironing."

"Your muslin aprons have to be ironed. Begin as I did with the shirt, and iron first the parts which will crease the least, such as the bands and strings. Then iron all along the bottoms until they are stiff and dry. After that turn the aprons round, and iron up into the gathers with the right hand, keeping them open with the point of the iron, and holding the aprons firmly with the left."

"I will goffer the lace on the bib for you," said Mrs. Hall, "if you have ironed it flat."

"The irons are hot," said Mary, as she took them out of the fire, wiped them on a clean duster, and handed them to her mother.

Mrs. Hall put her thumb and second finger through the handles, took hold of the lace with the irons, and turned the thumb back under-

neath, pressing the frills to the irons with the first and second fingers of the other hand. After this was finished the apron was folded in three, and put to air.

"We still have the table-cloths and handkerchiefs to iron," said Mrs. Hall to Mary. "The



table-cloths must be ironed on both sides, and then carefully folded and placed on the clothes-horse to air. The handkerchiefs should be opened and ironed first along the edges. Then the centre is ironed, and the handkerchief folded down the middle on the wrong side. The selvedges are folded back singly to the

centre, and the length then folded into four, with the name on the top when finished.

"Our underclothes are only ironed just enough to make them smooth, as a great deal of ironing tends to give them a yellow colour."

## AIRING

Mrs. Hall already had some of her clean linen airing on the clothes-horse in front of the fire.

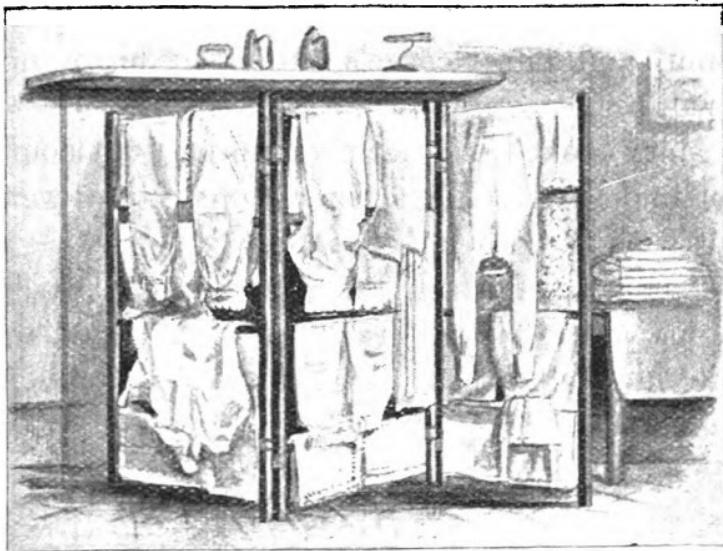
"Some of these things must be quite wet yet," said Mary, "see how they are steaming."

"If I had put the clothes straight away after mangling or ironing," said her mother, "it would have been very dangerous to the health of the person who wore them, unless they were aired before being used. If you remember, we damped the clothes both for ironing and for mangling, and this dampness must be got rid of before the clothes can be safely worn."

"All those things which were mangled," said Mary, "I hung up on the line near the kitchen ceiling, because the clothes-horse was already full."

"That will do very well," said Mrs. Hall.

"I am very careful in this matter, for colds, coughs, and stiffness of the limbs are often caused by neglecting to thoroughly air the clothes. Sleeping in damp sheets is very dangerous. The heat of the body is used to evaporate the water or dampness in the



sheets, and so the body becomes colder than it should be.

"If it had been a nice, warm, sunny day, I could have hung the clothes out in the garden in the sun, and that would have answered the same purpose as placing them in front of the fire. But when clothes are aired in and by

the sun, they should be brought indoors long before the sun sets."

"I think these shirts and table-cloths are quite aired now," said Mary.

"You may fold them up carefully and neatly," said Mrs. Hall, after she had looked at them, "and put them into their places. Take your own and Ruth's clothes to your room, and put George's things in his room. I will see after my own."

Mary looked out her own clothes, but could not find her stockings, for of course they were not with the other things.

"You will find all the stockings and socks in my work-basket, waiting to be mended," said Mary's mother. "We will see to them after tea."

## FOOD

[*The Chemistry of Food may not form part of the Course for Standard IV. See Code for 1896.*]

MR. HALL and his family had been about a year in London when, one evening towards the end of September, George brought home a window-bill which some one had given him in the street. He gave the bill to his father, who saw that a very clever man was going to

give four lectures on Food at the Institute close by.

"Well, I think we may as well go," said Mr. Hall, after he had read the bill. "One cannot know too much, and I am afraid none of us know one-half of what we ought to know of the food by which we live and grow." So, after a talk with his wife, it was arranged that Mr. Hall and the children should go, and that Mrs. Hall should remain at home and look after the house.

Seven o'clock of October 3rd found Mary and Ruth and George and their father at the opening lecture. If using language which ordinary people cannot understand makes a man clever, the lecturer was clever indeed. Mr. Hall listened; Mary wrote down two pages of names which were mostly spelled wrongly; Ruth gave up because she could not understand; and George did the most sensible thing he could do and went to sleep.

After an hour and a half of what Mr. Hall called agony, the lecture came to an end, and the four went home. There they found Mrs. Hall's brother, who was a chemist, and who lived a few streets off.

"Holloa!" said Mr. Creswell, as Mr. Hall came in. "So you have been improving your

mind, have you? Well, I hope you have enjoyed yourself. I had an hour of it once, but that was enough for me."

"What a pity," replied Mr. Hall, "that clever people have not the common sense to use common words which ordinary people can understand. Fancy a man in an hour and a half, using half the hard words in the dictionary. Fancy starting with oxygen, nitrogen, and a thousand and one other things which should come later on, and not in a first lecture on food."

"That is so," said Mr. Creswell; "but even if he had used short, sensible words, to begin with the chemistry of food is not very sensible. He should have begun with the circulation of the blood, otherwise he could not explain how the food gets to the various parts of the body after you have eaten it."

"Oh, Mary and I know a little about that," said Ruth. "All those who are in the village school, near Epsom, where we lived before we came to London, have a lesson every week on some part or other of the body."

"And quite right, too," said her uncle. "Children learn the geography of Europe; why should they not also learn the geography of their own bodies? They need not

learn a lot ; but to know a little about ourselves is surely far more useful than to learn hundreds of names about a country far away which in no way concerns us."

Just then the supper was ready, and had the clever lecturer heard what was said of him during supper-time, he would have had an unhappy quarter of an hour.

#### **ELEMENTARY CIRCULATION OF THE BLOOD**

"Do you know, Alfred," said Mrs. Hall to her brother, "it was a wonder I had not died last week ? I nearly cut off the top of my thumb. I was cutting some bread, and as near as possible bled to death. If it had not been for Mrs. Jones I really believe I should have died."

Her brother smiled at this, and asked his sister how much blood she thought had run out of her thumb. When she replied, "a half-pint," he smiled still more, and said, "When we are in trouble we always make it appear ten times greater than it really is." Then he told Mrs. Hall that she had really lost but very little, as in the body of an ordinary person there were at least nine pints.

After this Mr. Hall, who did not know very

much about the inside of the body, asked a great many questions. He did not quite know where the blood really was ; and I am afraid he thought that the flesh of the body held the blood, very much as a wet sponge holds water.

But his brother-in-law explained it to him in a very simple way. "First," said he, "you know that if you hang up in the air a thin bladder filled with water, the water will ooze out and the air will go in. Or, if you fill a bladder with air and sink it in water, the air will come out and water will go in. From this you will see that liquids can go through thin skins. But let this remain for a moment.

" You know," went on Mr. Creswell, "where the gas-works are. If you go up to the entrance where they are repairing the main-pipes, you will see the streets broken up and the large pipes running from one end of the street to the other. You will also see that where the main-pipe comes to a side street, a smaller pipe comes out of the larger pipe and runs through the smaller street. If this pipe were opened up, that is, if the road were broken up so that you could see the pipe, you would find that smaller gas-pipes come out of

it, and go into each house on both sides of the street.

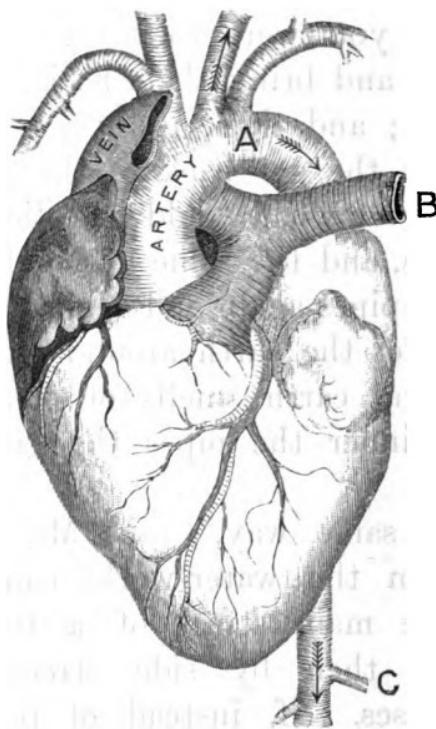
"When one of these pipes," continued George's uncle, "gets into the house, many still smaller pipes branch out of it and go to the various rooms. Now, if, instead of putting on burners, you were to bend these small pipes round, and bring them back to the side street again ; and then, if by a return pipe you brought the gas back to the gas-works, you would have what would be called a circulation of gas, and the same gas could be sent through the pipes again and again.

"Whenever the earth around gas-pipes is disturbed the earth smells of escaped gas, and the thinner the pipes the greater the escape.

"In the same way," said Mr. Creswell, "water from the water-works can be sent through the main street of a town or a village, and then by side streets to the various houses. If, instead of putting on taps, the pipes were bent round, the water could be brought out again to the side street, and then by a return pipe taken back through the main street to the water-works. You would thus get a circulation of water."

No doubt much of the earth around the

water-pipes would be damp with water which had escaped; and no doubt much impure matter from the earth would get into the pipes and make the water impure. As in the case of the gas, the thinner the pipes

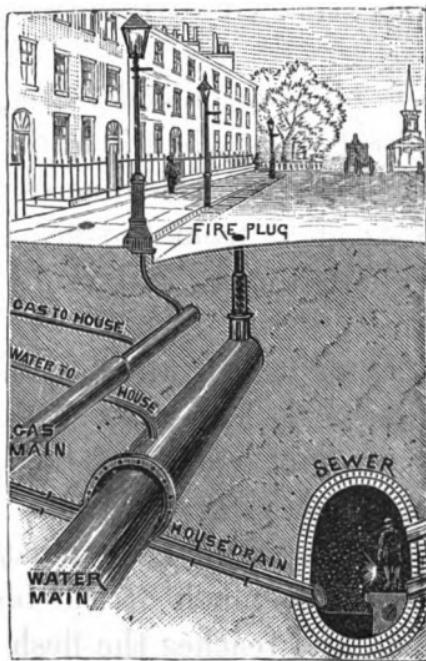


the greater would be the amount of water passing out of the pipes, and of impurities passing into them from the earth around.

And the blood circulates in the body very much in the same way. You at times can

easily see the cut ends of pipes in meat, both before and after it is cooked. These pipes are pipes through which the blood flows.

The gas is pumped or forced through the gas-pipes, and the water is pumped or forced



through the water-pipes. And in the same way the blood is pumped or forced through the blood-pipes or blood-vessels, as they are called.

The pumping of the gas and the water is

done by machinery, engines, and steam ; but the pumping of the blood is done by the heart. From birth to death the heart is always at work. One moment it contracts, and the next it expands. It contracts about seventy times in a minute, so that blood is pumped or forced into the pipes attached to it seventy times in a minute.

The chief pipe or blood-vessel, through which the blood flows when it is squeezed out of the heart, is nearly an inch across ; and the further it goes away from the heart the more pipes branch out from it, and the smaller the pipes become.

These pipes or vessels after a time, as they run through the flesh, get so small that the ordinary eye cannot see them, but the blood flows through them for all that. As these little pipes are so small they must be very thin, and therefore much of the blood oozes through them, and reaches the flesh outside.

“ If,” said Mrs. Hall’s brother, “ the lecturer had begun with this first, it would have been easy enough for ordinary people to see that if the food can be prepared and dissolved in the stomach, it could ooze into the blood-vessels, and then be carried to all those parts of the body where it may be wanted.

"Our hair, and our nails, and our skin grow as well as the other parts of the body, and to talk about putting food into the stomach, without knowing how you are going to get it to where it is wanted, seems putting the cart before the horse.

"Of course," said Mr. Creswell, "the large pipes of the body have names, just as the large rivers of a country have names. Doctors, of course, know these names as school children know the names of the rivers, but ordinary people need not trouble themselves about learning a lot of medical names.

"Perhaps, however, they might be told that the pipes in which the blood flows are called blood-vessels, and that the large ones are known as veins and arteries. In the arteries the blood is flowing from the heart to the smaller pipes, and in the veins it is flowing from the smaller pipes to the heart."

As it was getting late by the time that George's uncle had explained how the blood travelled to all parts of the body, he promised to come on the following Thursday and have a chat with them on food, and wished them good night.

**ELEMENTARY COMPOSITION OF FOOD**

According to his promise, Mr. Creswell came to see his sister and her family on the Thursday, and, as it was early closing day for the shops, he came earlier than he generally did. He had not been speaking long to them on food before he found out that the two girls knew a great deal about the names used in lessons on food and digestion ; but he also found that although they knew the names, that was about all they did know.

"Can you tell me, George, why people eat food ?" said his uncle to him as he came in from the garden.

"So that they may grow bigger, I suppose," replied George.

"But my food does not make me grow bigger," said his uncle.

"But mine does," again replied George. "The clothes I wore last year are a great deal too small for me now. Besides, I am taller and heavier."

"And what would happen if you were taken ill and could not take any food ?" went on Mr. Creswell.

"Well, I suppose I should not grow until I was well again," said George.

"No, you would not," broke in Ruth; "and besides not growing bigger, you would become very thin and a great deal smaller. Clara Johnston was taken ill last year, and she got so thin and weak, that she did not weigh anything like that which she weighed before she was taken ill."

"And is she heavier again now that she is well?" said her uncle.

"Yes, a great deal heavier," replied his niece.

"Now, George," said Mr. Creswell, "can you tell me where the flesh and the fat come from which are added to a person's body as he gets heavier after being ill?"

"From his food, of course," said George.

"But suppose a person did not eat any meat, either lean or fat," asked his uncle, "would he get heavier then?"

"But all people do have some meat," said George. "If they do not get meat in slices they get milk and butter and cheese, and that is the same as meat, as all three come from animals."

"And now, Mary, suppose a farmer were to put a calf in a field and keep it there for a year or two, what would happen to the calf?" said her uncle to her.

"It would grow into a cow," replied Mary.

"But where would its lean and its fat and its bone and its skin and its hair come from?" asked Mr. Creswell.

For a moment they were all silent, as the growing of the calf was a little different from George's growing heavier as he grew older. George ate meat and milk and cheese and eggs, as well as bread and vegetables, and he thought that his body was formed from them. But the calf had eaten nothing but grass; and neither Mr. Hall nor his three children quite saw how the calf could change grass into meat.

To them all it was very plain that if the calf had eaten nothing but the grass of the field, there was nothing in the meat of the calf that was not to be found in the grass. They then saw that meat was nothing more nor less than changed grass; but they did not see how this change had been made.

"Never mind how the change has come about," said Mr. Creswell; "you can see that veal, that is, the flesh of a calf, is made from grass, and from nothing else."

In the same way mutton is made from grass and from turnips and other vegetables, which are given to sheep as food.

Similarly, horses running wild are made of grass, whilst horses fed in a stable on hay and oats are made from what they can get out of the hay and the oats. Elephants, in the same way, live entirely on vegetables; whilst wild pigs and rabbits and hares and deer do the same.

Some animals, like the lion and the tiger, live entirely on flesh. They kill and eat other animals, and therefore they are made entirely of the other animals. When a lion kills a deer and eats it, the flesh of the deer is changed into the flesh of the lion, but no one knows exactly how this is done. One thing, however, is very certain, and that is, that the flesh of the deer is made entirely of vegetables, such as grass and clover. So, if the deer is made of grass, and the lion is made of deer, the flesh of the lion really comes out of the grass which the deer had eaten.

In the same way tigers and leopards and panthers, and other flesh-eating animals, are really formed from the vegetables which the animals they kill had eaten.

"But," continued Mr. Creswell, "there are many animals which do not live entirely on either animals or vegetables. Fowls and ducks eat corn and seeds and grass and in-

sects. Dogs and cats eat meat and bread and potatoes, and bread and potatoes are vegetables.

"And so, in the same way, people eat both animals and vegetables; and inside, by some means unknown to us, the parts of their food are changed into parts of themselves, just as the grass of the field was changed into the flesh of the calf."

"Then," said Mr. Hall, "plants and animals are exactly alike, if what you say is true, and it certainly is."

"Yes," replied his brother-in-law, "as far as what they are made of is concerned. They are all made of the same things, but they are not all alike to look at when they are made. You may have half-a-dozen houses all made of bricks and mortar and wood and iron and slates; but they often do not look like each other any more than cows and sheep and horses, which have been fed on the same food."

If you burn plants you get a few ashes left, and the rest of the plant goes away into the air. It is the same with animals and people. If you burn them you get a little ash, and the rest also goes away into the air.

"And what becomes of the parts which are burnt off into the air?" said Mrs. Hall.

"The gases and vapours which burn off into the air," said her brother, "make the air impure, and if these matters remained in the air it would soon become too impure for people to breathe."

"But what becomes of them?" again asked Mrs. Hall.

"Why, they are used by plants," said Mr. Creswell. "Plants must have food, or they would not grow, and their food they get from the air as well as from the soil. If a dead body, say that of a dog, be buried in a garden, the roots of plants use it and change it into themselves, just as we take the plants and eat them and change them into ourselves."

"But if the dead body of the dog were burnt, most of it would pass off into the air, and plants in time take in the gases and vapours from the air by their leaves and use them as food, just as though they had taken them in by their roots from the soil."

"Now you see," went on George's uncle, "how it is that we eat both animal and vegetable foods. They are made of the same things, and both can be used by us to make us stronger and bigger."

Just then, Mrs. Hall called her husband and her brother and the three children into the next room to supper.

Whilst they were having their supper Mr. Hall did not say much, as he was thinking over what his wife's brother had said. It was then too late to ask him any more questions, so it was arranged that, on the following Monday, Mr. Creswell should run in again and finish what he wanted the children to know.

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On the Monday evening George's uncle again dropped in for a talk, as he had promised he would on the Thursday. He had not been in long before Mr. Hall wanted to know the names of the things of which animals and plants are made.

"Never mind about that now," said Mr. Creswell. "We can speak of those further on, perhaps next year. You remember that you all got into a fog when the lecturer mentioned their names to you. All these things are easy to understand; but if too much information be put into the mind at one time, the mind forgets one half and makes a sad hash of the other."

"But, as you have already heard of oxygen

and hydrogen and nitrogen, I may add to them carbon," continued Mary's uncle. "As all houses are built almost entirely of bricks and stones and mortar and wood, so every plant and every animal is almost entirely made of oxygen and hydrogen and nitrogen and carbon. But I will not say another word about either of them now."

"Very well," said Mr. Hall, when he found that his wife's brother would not say anything more about the composition of foods. "Do I understand that all our foods are parts of either animals or vegetables?"

"Oh! no," replied Mr. Creswell, "not all, but nearly all. Our food must be either one or other of these three kinds:—

ANIMAL.

VEGETABLE.

MINERAL.

It is not easy to say what a mineral is, so that Mary and Ruth and George may be able to understand. It will not do to say, as my own boy did the other day, that a mineral is a thing which comes out of the earth; because worms and potatoes come out of the earth, and they are not minerals."

If you burn some earth, many things pass

away into the air; but that which remains is mineral matter. If you burn a piece of wood, or if a person smokes a cigar, the ashes which are left are mineral. And in the same way, if you burn a piece of bone you get an ash, and this ash is mineral.

When a plant grows in earth its roots dissolve some of the earth and send it up in the sap. This earth hardens the plant; so that its trunk and branches and leaves may be firm and strong.

In the same way, animals which have bones have earthy, mineral matter in them too. Without earthy matter bones would be soft, and no animal and no person could keep itself upright. If our food contained no earthy matter to harden us, we should be softer than we are now, that is, most of us would be.

And so, if plants contain earth, as they certainly do, and we eat the plants, it is as certain that their earthy, mineral parts must be in us. It is mostly through plants that we get the earthy matter which hardens our bones; but some of it we get from the water we drink, and from the water which is used in cooking our food.

The water which we use has fallen upon the earth and the rocks as rain, and the minerals

which the water contains, it has dissolved out of the earth and the rocks as it has soaked down through them. More than half of our bones are taken from the earth, and almost the whole of our teeth.

### ELEMENTARY DIGESTION

"Yes, I quite see," said Mrs. Hall, "where our food comes from; but what I cannot understand is, how it becomes changed into us. I cannot see how beef and mutton and potatoes and bread become parts of me."

"No," replied her brother, "and you never will—neither will any one else. But although we cannot tell exactly how our breakfast and dinner and tea become changed into ourselves, we do know a great deal of what happens to them when they are inside our bodies.

"You know, Ruth, that when a potato is boiled it becomes softer, and you know that when meat is roasted or boiled it is not so tough to eat as it was before."

"Yes," said Ruth, "I know that. Food is cooked so that, when we eat it, we shall have less trouble with it inside than we should have if it were not cooked."

"Yes, that is so," said her uncle; "and

when we eat food we serve it pretty much as we do when we cook it.

"When we place it in our mouths our teeth crunch it up, and when it gets down into our stomachs it is made smaller and smaller still. I suppose, Mary," said her uncle, "you have cut open the stomach of a rabbit when you have been getting one ready for dinner?"

"Yes, many times," replied his niece.

"Well," said her uncle, "when the food is in the stomach it is there to be dissolved, so that it may easily soak through the skin of the stomach. The skin of the stomach is like the skin of the face; it has thousands of little blood-vessels or pipes in it, and the blood is always flowing through them."

"So," went on Mr. Creswell, "if we can get the food dissolved in the stomach it will soak through its skin, and go into the little thin pipes in which the blood is flowing. And after it has got into the blood-vessels it will be carried away to all parts of the body, and used wherever it is wanted."

"But how do pieces of bread and meat and cheese and other things get small enough to soak into the little pipes in which the blood flows?" said Mary to her uncle.

"Very much," he replied, "in the same

way that you make beef-tea and broth and stew. To make beef-tea you cut up the meat, and you place it in water, and you make it warm. By that means you dissolve a great deal of it, and make it very small, so small that it soon finds its way into the blood."

And when you put food into the stomach you do the same thing. The stomach is warm and wet. In it the food is softened and warmed and cooked ; and as the stomach is generally moving about, the food is dissolved, and partly absorbed into the blood.



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